CENTRAL AND SOUTHERN FLORIDA PROJECT

CENTRAL AND SOUTHERN FLORIDA PROJECT
DRAFT THIRD SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
TAMIAMI TRAIL MODIFICATIONS

MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT
SOUTH ATLANTIC DIVISION

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

MARCH 2007

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MODIFIED WATER DELIVERIES TO
EVERGLADES NATIONAL PARK, FLORIDA

ABSTRACT

The Tamiami Trail project is one component of the authorized "Modified Water Deliveries to the Everglades National Park" (MWD) Project, the purpose of which is to improve water deliveries for ecosystem restoration in Everglades National Park (ENP). A final General Re-evaluation Report and Second Supplemental Environmental Impact Statement (RGRR/SEIS) analyzed alternatives for re-designing Tamiami Trail so that increased MWD water flows could be conveyed south into the park without damaging the highway. A ROD was signed on January 25, 2006, with the condition that real estate rights required for the Selected Plan would be evaluated.

The proposed action presented and evaluated in this Third Supplemental Environmental Impact Statement involves the USACE securing real estate rights to the privately owned properties along Tamiami Trail consisting of Florida Power and Light Company, Radio One Communications, Coopertown Airboat Rides, Gator Park Airboat Tours, the Airboat Association of Florida, Everglades Safari Park, and Lincoln Financial Media. Real estate interests to be acquired are those identified in the refinement of engineering designs associated with the bridging and road raising of Tamiami Trail described in the 2005 RGRR/SEIS, as well as those real estate interests impacted by induced flooding from higher water levels associated with implementation of the MWD project. Under the proposed action, real estate acquisitions by the USACE would begin in 2007, resulting in the likely need to close two of the three airboat touring businesses because of construction impacts on access. Under no action, ENP would acquire real estate rights after scheduled completion of the ENP General Management Plan in 2009, thereby postponing the start of construction and the overall Everglades restoration effort; businesses would remain in operation in the interim, and ENP would be afforded the opportunity to retain the airboat tour businesses as concessionaires.

All information provided in the 1992 Final EIS, the 2003 GRR/SEIS and the 2005 RGRR/SES are incorporated herein by reference.

SEND YOUR COMMENTS TO THE DISTRICT ENGINEER BY MAY 7, 2007.

If you would like further information on this report, please contact:

Barbara Cintron
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232
Telephone: 904-232-1692
E-mail: Barbara.B.Cintron@saj02.usace.army.mil

EXECUTIVE SUMMARY

CENTRAL AND SOUTHERN FLORIDA PROJECT
DRAFT THIRD SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS)
TAMIAMI TRAIL MODIFICATIONS
MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK, FLORIDA

EXECUTIVE SUMMARY

Background. The Tamiami Trail project is one component of the authorized "Modified Water Deliveries to the Everglades National Park" Project (often referred to as Mod Waters or MWD). The overall project consists of structural modifications and additions to the existing Central & Southern Florida Project. These modifications will improve water deliveries for ecosystem restoration in Everglades National Park (ENP). The original authorizing document for MWD is the 1992 General Design Memorandum (GDM) and Environmental Impact Statement (EIS) titled *Central and Southern Florida Project, Modified Water Deliveries to the Everglades National Park*. The MWD Plan selected in the 1993 Record of Decision (ROD) included only minor modification of Tamiami Trail (U.S. 41) because the analysis for the GDM indicated there was sufficient conveyance across the Trail to accommodate the flows predicted for Mod Waters. However, analyses conducted in the late 1990s and through 2005 indicated that the existing culverts would not be able to provide the maximum desired volume of water. Furthermore, as other elements of Mod Waters were developed and operations of the combined C-111 and Mod Waters system were modeled, it became clear that the high water elevations (stages) reached under high rainfall conditions on the north side of Tamiami Trail in the L-29 Canal would be higher than described in the 1992 GDM. The Florida Department of Transportation (FDOT), in its comments on the 2000 Revised GRR/SEIS for Tamiami Trail, indicated that the increased water elevations would encroach on the highway sub-grade, possibly causing premature deterioration of the road and requiring more maintenance. Therefore, the USACE and cooperating agencies readdressed previously selected plans.

Additional water conveyance alternatives were reanalyzed and documented in a General Re-evaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS). The Final GRR/SEIS was coordinated with the public in December 2003, with a 3,000-ft bridge chosen as the Recommended Plan (due primarily to cost considerations for a larger conveyance). It was withdrawn without an ROD being signed. While the Tamiami conveyance alternatives were being developed, modeling and alternatives development were underway for the Interim Operating Plan (IOP) that would govern

water control operations in the Mod Waters system. The IOP plan was documented in a Final Environmental Impact Statement in 2002. This Plan allows water stages in the L-29 borrow canal to reach up to an elevation of 8.9 ft (using the National Geodetic Vertical Datum [NGVD]) under extreme rainfall events. By later 2004 it was clear that FDOT would not approve the plan recommended in the 2003 FEIS (a 3,000-foot-long bridge) without provisions for improvements to the unbridged portion of Eastern Tamiami Trail. Further, The Department of Interior (DOI) asked the USACE to reevaluate the alternatives with a higher stage in the L-29 Canal and to further consider the 4-mile Bridge Alternative developed during the 2000-2003 GRR revisions. A revised draft and final GRR and 2nd SEIS were prepared in 2005 as an integrated document to update the alternative analysis under NEPA and provide a Post Authorization Change (PAC) Report. This document recommended road raising as well as two bridged road segments. An ROD selecting the Preferred Alternative, which consisted of a raised road profile with a two-mile bridge at the western region of the project and a one-mile bridge at the eastern end, was signed on January 25, 2006.

Subsequent to the completion of the 2005 RGRR/SEIS, the USACE completed a detailed land survey of the project corridor, and the engineering designs of the project have proceeded. These advancements have allowed the USACE to complete a more accurate determination of real estate needs than was possible in the 2005 RGRR/SEIS.

The 2005 RGRR/SEIS did not address induced flooding impacts to parcels along Tamiami Trail that would result from the increase in water elevation and hydroperiod after implementation of the MWD project. The RGRR/SEIS assumed that the NPS would acquire the necessary real estate interests in private parcels of land before completing the construction of Tamiami Trail and before initiating water flows to restore ENP. However, because the NPS must complete its General Management Plan (GMP) (scheduled for completion in 2009) before it can proceed with real estate acquisitions, it is unable to meet the schedule for Tamiami Trail construction. Therefore, the Corps is proceeding with acquisition, which would begin in 2007.

Purpose. The purpose of this document is to communicate engineering and construction designs that have been refined by the USACE since completion of the RGRR/SEIS, and to evaluate real estate interests to be acquired on the south side of Tamiami Trail. Real estate interests include those needed for bridging and road-raising of Tamiami Trail, as described in the 2005 RGRR/SEIS, and for induced flooding associated with the MWD project.

Recommended Action. Construction details: A two-mile-long bridge system in the western portion of the project area and a one-mile bridge in the eastern portion of the project area would be constructed. The plan would create hydraulic conveyance openings through Tamiami Trail by removing up to three miles (cumulative) of the existing highway, embankment, and associated culverts. Bridges would be constructed over each opening to replace the removed section of road so that motor vehicle traffic would be maintained. The study area is shown in Figure 1.

The crown elevation of the unbridged portions of the roadway would be raised to approximately 12.3 ft NGVD. In meeting with current FDOT standards for roadway geometry, the raised profile of the roadway would require a wider roadbed than currently exists and a wider embankment on the southern edge of the road to stabilize side slopes. The reconstructed roadway would consist of two 12-foot-wide travel lanes and a 10-foot-wide shoulder on each side of the roadway.

Real Estate Rights: The wider roadbed, construction operations, and increased water elevations associated with MWD would encroach upon seven privately owned parcels of land on the south side of Tamiami Trail. These parcels have been analyzed to determine whether structural solutions consistent with restoration would be more cost effective than real estate acquisition. If the cost of the structural solutions exceeds the fair market value of the property, it is in the best interest of the government to acquire the property in fee. Otherwise, property for highway construction would be acquired in fee, while at a minimum, a perpetual flowage would be purchased from owners.

1. Lincoln Financial Media: To remain functional during construction, modifications to existing structures would be required including access roads as well as communication towers and buildings. Preliminary information indicates that at a minimum, a perpetual flowage easement would be required for induced flooding. Property for highway construction would be acquired in fee. If additional assessments reveal that the cost of modifications exceeds the fee value of the property, the property would most likely be acquired through fee by the government.

2. Everglades Safari Park: The tract's parking lot and some structures would be eliminated to construct the western bridges. Furthermore, large portions of the property are expected to flood at the 50 percent daily stage duration and 10- and 100-year stage frequencies for MWD operations. It would therefore be necessary for the government to acquire the property in fee.

3. Airboat Association of Florida: Additional right-of-way required for construction of the TSP would encroach on this property, but Association members would continue to have access. Property for additional right-of-way would be acquired in fee. The USACE proposes to obtain at a minimum, a perpetual flowage easement from the Airboat Association for the remaining land.

4. Gator Park Airboat Tours: This business would lose a portion of its parking lot immediately adjacent to Tamiami Trail for construction of the TSP. Additionally, some of the property would be affected by the 50 percent daily stage duration and 10- and 100-year stage frequencies for MWD operations. Pending completion of real estate appraisals, the most likely action appears to be the securing at a minimum, a perpetual flowage and fee for the additional highway right-of-way.

5. Coopertown Airboat Tours and Restaurant: The parking lot would be taken to widen Tamiami Trail, and lack of access to the business would not allow it to operate during construction. Additionally, the property would be affected by induced flooding. It would likely be necessary for the government to acquire the land through fee.

6. Radio One Communications: To remain functional, modifications would be required to the existing structures and lands including access roads and communications towers. Preliminary information indicates that at a minimum, a perpetual flowage easement would be required for induced flooding. If additional assessments reveal that the cost of modifications exceeds the fee value of the property, the property would most likely be acquired through fee by the government.

7. Florida Power and Light: Additional right-of-way necessary for road construction would be acquired in fee. Additionally, at a minimum, a perpetual flowage easement would be needed at the 100-year stage for restored water flows.

The proposed action involves the USACE beginning the acquisition of real estate interests 2007, with Gator Park the only airboat touring business possibly remaining in operation during and after construction.

The No-Action Alternative would result in ENP acquiring real estate interests after completion of its GMP in 2009. The airboat touring businesses

would remain open in the interim. Following completion of the GMP, ENP would have an opportunity to decide whether to retain any of the airboat touring businesses as concessions, if practical, after acquiring real estate interests for each business. The No-Action Alternative would postpone the overall Everglades restoration effort.

ENP Environmental Resources: By proceeding with real estate acquisition to meet the schedule for Tamiami Trail construction, the TSP would expedite the onset of MWD implementation, thereby providing restoration benefits sooner than would be possible under the No-Action Alternative.

Cultural Resources: Culturally significant properties, including Coopertown and the Airboat Association of Florida, would be impacted by construction and inundation from water elevations associated with the MWD project. The construction right-of-way required for reconstruction of the highway would result in the taking of Coopertown's entire parking area, and most of Coopertown's property would be inundated at the 100-year stage. Additional right-of-way required for construction would encroach on property belonging to the Airboat Association and project implementation would result in an increase in the elevation and duration of water on approximately 10 acres at the site owned by the Airboat Association of Florida. The USACE would obtain a perpetual flowage easement because of induced flooding. The Tamiami Trail, itself a historic property eligible for NRHP listing, would be reconstructed with bridged portions of the highway embankment removed.

Tourism: The airboat businesses on Tamiami Trail—Everglades Safari Park, Gator Park, and Coopertown Airboat Rides—draw a large influx of state, national, and international tourists to this area of ENP. Therefore, closure of Everglades Safari and Coopertown would significantly limit ecotourism options for thousands of tourists.

Areas of Controversy/Unresolved Issues. Areas of controversy/unresolved issues. The main area of controversy associated with this project involves construction and flooding impacts on businesses south of the Tamiami Trail. ENP and fishing and sporting organizations have expressed particular concerns about the possible loss of airboat tour operations.

Unresolved issues include the following:

- Supplemental Features of the Project. Three features have been proposed for incorporation into the project: culvert maintenance swales, an additional five feet of right-of-way to comply with FDOT canal safety requirements, and bridge construction easements. All three features are currently being coordinated with ENP.

- Real Estate. Some uncertainty remains on what real estate interests are required by the USACE with regard to private properties located in the project area. Real estate issues are unlikely to be resolved until appraisals have been completed. Coordination between the USACE and ENP on this issue has been ongoing.

- Florida Panther Consultation. Design refinements and the possible incorporation of additional features into the project have resulted in more impacts on potential Florida panther habitat than were determined in the 2005 RGRR/SEIS. Evaluations are continuing on whether the additional impacts justify reopening formal consultation for the Florida panther under Section 7 of the Endangered Species Act.

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Section 1.0
INTRODUCTION

The Tamiami Trail project is one component of the authorized "Modified Water Deliveries to the Everglades National Park" Project (often referred to as Mod Waters or MWD). The overall project consists of structural modifications and additions to the existing Central and Southern Florida Project. These modifications will improve water deliveries for ecosystem restoration in Everglades National Park (ENP).

The original authorizing document for MWD is the 1992 General Design Memorandum (GDM) and Environmental Impact Statement (EIS) titled "Central and Southern Florida Project, Modified Water Deliveries to the Everglades National Park." The MWD Plan selected in the 1993 Record of Decision (ROD) included only minor modification of Tamiami Trail (U.S. 41) because the analysis for the GDM indicated there was sufficient conveyance across the Trail to accommodate the flows predicted for "Mod Waters." Analyses conducted in the late 1990s and through 2005 indicated that the existing culverts would not be able to provide the maximum desired volume of water. Furthermore, as other elements of "Mod Waters" were developed and operations of the combined C-111 and "Mod Waters" system were modeled, it became clear that the high water elevations (stages) reached under high rainfall conditions on the north side of Tamiami Trail in the L-29 Canal will be higher than described in the 1992 GDM. The Florida Department of Transportation (FDOT), in its comments on the 2000 Revised GRR/SEIS for Tamiami Trail, indicated that the increased water elevations would encroach on the highway sub-grade, possibly causing premature deterioration of the road and requiring more maintenance.

Therefore, the Corps and cooperating agencies readdressed previously selected plans. Additional water conveyance alternatives including a 10.7 mile elevated section and bridge alternatives of several lengths were reanalyzed, beginning in 2000. The alternatives were documented in a General Re-evaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS). The Final GRR/SEIS was coordinated with the public in December 2003, with a 3,000-ft bridge as the Recommended Plan (due primarily to cost considerations for a larger conveyance), but it was withdrawn without an ROD being signed. While the Tamiami conveyance alternatives were being developed, modeling and alternatives development were underway for the Interim Operating Plan (IOP) that would govern water control operations in the "Mod Waters" system. The IOP plan was documented in a Final Environmental Impact Statement in 2002. This Plan allows water stages in the L-29 borrow canal to reach up to 8.9 ft under extreme rainfall events. By later 2004 it was clear that FDOT would not

approve the plan recommended in the 2003 FEIS (a 3,000-foot long bridge) without provisions for improvements to the unbridged portion of Eastern Tamiami Trail. Further, The Department of Interior (DOI) asked the USACE to reevaluate the alternatives with a higher stage in the L-29 Canal and to further consider the four-mile Bridge Alternative developed during the 2000-2003 GRR revisions. A revised draft and final GRR and second SEIS were prepared in 2005 as an integrated document to update the alternative analysis under NEPA and provide a Post Authorization Change (PAC) Report. This document recommended road raising as well as two bridged road segments. An ROD selecting the Preferred Alternative, which consisted of a raised road profile with a two-mile bridge at the western region of the project and a one-mile bridge at the eastern end, was signed on January 25, 2006.

The RGRR/SEIS addressed the USACE need to acquire a real estate interest in portions of the private properties that would lie within the construction footprint of the reconstructed road and bridges and the disposition of the utilities within the road right-of-way. However, it did not address induced flooding impacts that would result from the increase in water elevation and hydroperiod after implementation of the MWD project. This would occur on six private properties south of the Tamiami Trail located within the boundaries of the ENP Expansion Area and also on land owned by the Airboat Association of Florida (which is not included within the Expansion Area). The RGRR/SEIS assumed that the National Park Service (NPS) would acquire the necessary real estate interests in these private parcels of land adjacent to the south side of Tamiami Trail before the completion of construction of the Tamiami Trail project and before initiation of ecosystem restoration water flows directed south into ENP under the Combined Structural and Operational Plan (CSOP). However, because the NPS must complete its General Management Plan before is can proceed with real estate acquisitions, it is unable to meet the schedule for Tamiami Trail construction. Therefore, the Corps is proceeding with acquisition.

The proposed action presented and evaluated in this Third Supplemental Environmental Impact Statement is the acquisition by USACE of real estate rights to the privately owned properties along Tamiami Trail consisting of Florida Power and Light Company, Radio One Communications, Coopertown Airboat Rides, Gator Park Airboat Tours, the Airboat Association of Florida, Everglades Safari Park, and Lincoln Financial Media. Real estate interests to be acquired are those identified in the refinement of engineering designs associated with the bridging and road raising of Tamiami Trail described in the November 2005 RGRR/SEIS, as well as those real estate interests associated with lands impacted by induced flooding from higher water levels associated with implementation of the MWD project.

1.1 PROJECT PARTNERS

The South Florida Water Management District (SFWMD) is the local, Non-Federal Sponsor for this Central and South Florida (C&SF) project, except for the roadway elements. The FDOT will be responsible for roadway operation, maintenance, repair, replacement and rehabilitation (OMRRR). Other participating agencies include the U.S. Department of Interior (Fish and Wildlife Service [FWS] and National Park Service [NPS], Everglades National Park [ENP]), the Florida Fish and Wildlife Conservation Commission (FWC), the Miami-Dade County Department of Environmental Resource Management (DERM), and the Florida Department of Environmental Protection (FDEP). ENP should be considered a cooperating agency in regards to NEPA for the Mod Waters project.

1.2 PURPOSE AND NEED FOR ACTION

The 2005 RGRR/SEIS selected a raised road profile with a two-mile bridge at the western region of the project and a one-mile bridge at the eastern end as the Recommended Plan. The RGRR/SEIS addressed the need to acquire a real estate interest in portions of the private properties that would lie within the construction footprint of the reconstructed road and bridges and the disposition of the utilities within the road right-of-way. However, the RGRR/SEIS did not address induced flooding impacts that would result from the increase in water elevation and hydroperiod after implementation of the MWD project. In addition, the RGRR/SEIS assumed that the National Park Service (NPS) would acquire the necessary real estate interests in these private parcels of land before the completion of construction of the Tamiami Trail project and before initiation restoration water flows directed south into ENP. However, because the NPS must complete its General Management Plan before is can proceed with real estate acquisitions, it is unable to meet the schedule for Tamiami Trail construction. Therefore, the Corps is proceeding with acquisition.

Refinement of the project engineering designs subsequent to the publication of the RGRR/SEIS has shown that the construction of the project would require securing more real estate interests from private landowners than were projected in the RGRR/SEIS.

The proposed action addressed in this EIS is to secure real estate rights to the properties owned by Florida Power and Light Company, Radio One Communications, Coopertown Airboat Rides, Gator Park Airboat Tours, the Airboat Association of Florida, Everglades Safari Park, and Lincoln Financial Media. Real estate interests to be acquired are those identified in the refinement of engineering designs associated with the bridging and road

raising of Tamiami Trail described in the November 2005 RGRR/SEIS, as well as those real estate interests associated with lands impacted by induced flooding from higher water levels associated with implementation of the MWD project.

1.3 STUDY AREA/PROJECT AREA

As mentioned in Section 1.0, this project to modify the Tamiami Trail is a component of the larger MWD program described in the 1992 GDM/FEIS. The study area for the MWD program is located in Broward and Miami-Dade counties, Florida. The study area includes ENP, privately owned lands in the East Everglades, WCA-3A, and WCA-3B. It is bounded on the west by the Big Cypress National Preserve, on the north by the Everglades Agricultural Area and WCA-2, and on the east by Levee 30 (L-30), L-31N, and L-31W.

The project limits are shown in Figure 1. The areas subject to direct impacts from the project flank both sides of U.S. Highway 41, commonly called the Tamiami (Tampa to Miami) Trail. The Tamiami Trail, the L-29 Canal, and the L-29 Levee on the north side of the canal form the southern boundary of WCA-3B (see Figure 2). The south side of the Tamiami Trail is bounded primarily by ENP, but six private properties are also located on the south side of the highway.

The limits of the project begin at S-334, slightly more than one mile west of the intersection of Krome Avenue (State Road 997) and the Tamiami Trail, and extend westward along the highway approximately 10.7 miles to Water Control Structure S-333. The L-29 Canal, also known as the Tamiami Canal, runs along the north side of the Tamiami Trail through this area. The project limits are bounded at each end by water control structures across the canal, S-333 on the west and S-334 on the east. Bridges on these structures provide access to boat ramps and recreation sites on the north side of the canal. The two unimproved roads located on the north side of the L-29 Canal, one along the canal bank and one about 100 ft from the canal bank on top of the levee, parallel the canal. These roads are surfaced with crushed limerock. The roads provide vehicle access for the members of the Miccosukee Tribe of Indians living in the Tigertail Camp, for four boat launch ramps, and for recreational fishermen who fish from the L-29 Levee. Figure 3 shows the project area in relation to other MWD and other federal projects.

1.4 HISTORY OF THE AREA

Historically, the Everglades was a shallow wetland conveying water from Lake Okeechobee to the southern coast of Florida. Although modifications to

the flow of water were begun in the 1880s, most of the flow alterations were associated with the development of the C&SF Flood Control Project, which was originally authorized by Congress in 1948. In the last 50 years, the construction of the C&SF Project has created many problems by converting nearly half of the original Everglades ecosystem to agricultural and urban uses. With the construction of WCA-3A and WCA-3B and the extension of Levee 67 (L-67 ext.), operations of the system changed. Flows to ENP were affected by water supply deficits during the dry season and excesses during the wet season, resulting in a decline in ecological quality. Changes in hydrology have also altered Everglades topography due to drainage, soil oxidation, subsidence, erosion-deposition, and burning.

The Flood Control Act of 1968 provided for modifications to the C&SF Project through the implementation of the Everglades National Park-South Dade Conveyance System (ENP-SDCS). The intent was to improve the supply and distribution of water to ENP and to provide for increased agricultural and urban water needs of Miami-Dade County.

Congress passed Public Law (PL) 91-282 in June 1970 to establish a minimum water delivery schedule to protect ENP resources. Later, the Experimental Program of Water Deliveries to ENP (Section 1302 of the Supplemental Appropriations Act of 1984; PL 98-181) authorized modifications to improve the schedule of minimum water deliveries established in PL 91-282. This program allowed for a two-year Experimental Program for Water Deliveries to ENP for the purposes of developing an improved regulation/delivery schedule. In response to PL 98-181, the USACE completed the General Plan for Implementation of an Improved Water Delivery Schedule to Everglades National Park, Florida, which was approved by the Secretary of the Army in February 1985. This plan recommended: (1) the preparation of a GDM and an EIS addressing modifications to improve water deliveries to ENP and (2) extension of the two-year time limit specified in PL 98-181 based on a written agreement between USACE, ENP, and SFWMD. The Experimental Program of Water Deliveries was subsequently extended to January 1, 1989, and January 1, 1992, under PL 99-190 and PL 100-676, respectively.

Section 107 of PL 102-104, August 17, 1991, authorized continuation of the experimental programs until the completion of modifications to the C&SF Project, authorized by Section 104 of PL 101-229 (Everglades National Park Protection and Expansion Act of 1989). PL 101-229 was the basic authorization for the 1992 GDM/FEIS.

Section 528 of the Water Resources Development Act (WRDA) enacted October 1996 (PL 102-580) was entitled *Everglades and South Florida*

Ecosystem Restoration. It authorized a number of ecosystem restoration studies, formerly referred to as "the Restudy," and now collectively known as the Comprehensive Everglades Restoration Plan. The USACE submitted a report to Congress on July 1, 1999, containing the CERP blueprint, which would further increase the flow of water entering NESS. The plan was approved as part of WRDA 2000, which included a requirement that the MWD project must be constructed before certain CERP components can be funded for construction. Section 601(b)(2)(D)(iv) stated:

> *No appropriation shall be made to construct the Water Conservation Area 3 Decompartmentalization and Sheetflow Enhancement Project (including component AA, Additional S-345 Structures; component QQ Phase 1, Raise and Bridge East Portion of Tamiami Trail and Fill Miami Canal within WCA 3; component QQ Phase 2, WCA 3 Decompartmentalization and Sheetflow Enhancement; and component SS, North New River Improvements) or the Central Lake Belt Storage Project (including components S and EEE, Central Lake Belt Storage Area) until the completion of the project to improve water deliveries to Everglades National Park authorized by section 104 of the Everglades National Park Protection and Expansion Act of 1989 (16 U.S.C. 410r-8).*

1.5 PRIOR STUDIES AND RELATED PROJECTS

Several previous studies are relevant to the current study.

1.5.1 General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992

This document described the evolution of alternative plans considered for improving water deliveries to ENP. It also described the relationships between hydrologic and ecological conditions in the Everglades, historic conditions, existing baseline conditions, and expected future conditions of the Everglades without improved water deliveries.

There were four components of the 1992 GDM/FEIS:

1. Conveyance of water between WCA-3A and WCA-3B (Conveyance and Seepage).
2. Conveyance of water south across the Tamiami Trail to the NESS portion of ENP (Tamiami Trail Modifications).
3. Flood Mitigation of the 8.5 square mile area (SMA) residential development along the eastern side of NESS (8.5 SMA).

4. An overall operational plan incorporated in the above and in the C-111 basin. (This plan is referred to as "CSOP;" short for Combined Structural and Operational Plan. It incorporated studies of the conveyance structures referenced in Item 1 above needed to move water between WCA-3A and WCA-3B). CSOP addresses water control operations in both the Mod Waters components and the C-111 components of the Central and Southern Florida system.

The 1992 GDM/FEIS also provided an explanation of the alternative plan formulation and evaluation process. Alternative plans were evaluated and screened out or selected for further analysis. Basic alternative plans were developed to meet the objectives of location, timing, and volume of water to be delivered to ENP. The 1992 GDM/FEIS recommended several features, which included raising an approximately 1,500-foot long section of the Tamiami Trail adjacent to structure S-334.

1.5.2 Integrated General Reevaluation Report and Environmental Impact Statement, Canal 111 (C-111), South Miami-Dade County, Florida, May 1994

This report, which integrated a feasibility report level of documentation with an EIS, provided an assessment of the authorized C&SF Flood Control Project within the C-111 basin. This would ensure that measures recommended for implementation were feasible and consistent with the protection of the natural values associated within ENP and maintenance of flood control within the C-111 basin east of Levee L-31N and C-111. The Recommended Plan included both structural and non-structural components, as well as modifications to existing work within the C-111 basin. It was expected to help restore the ecology of ENP in addition to maintaining flood protection within the C-111 basin east of L-31N and C-111. This report was approved in July 1994.

1.5.3 U.S. Fish and Wildlife Service Final Biological Opinion for the U.S. Army Corps of Engineers, Modified Water Deliveries to Everglades National Park, Experimental Water Deliveries Program, Canal 111 Project, February 19, 1999

This biological opinion, predicated on consultation by the USACE, ENP, SFWMD, FWS, and FWC, addressed operations of the two interrelated Everglades restoration projects: the MWD project and the C-111 projects through the Experimental Program (the operations of the system). This report reviewed the biology and ecology of threatened and endangered species, previous biological opinions prepared for similar actions in the action

area, the Technical Agency Draft of Volume I of the Multi-Species Recovery Plan for the Threatened and Endangered Species of South Florida, and other published and unpublished sources of information.

The 1999 Biological Opinion recommended changes to existing operations for the southern portion of the C&SF project needed to reduce adverse impacts to the endangered Cape Sable seaside sparrow. It provided a reasonable and prudent alternative (RPA) that was believed adequate to avoid jeopardy to the sparrow and ancillary terms and conditions needed for compliance. Specifically, the RPA required the following:

> *(1) By March 11, 1999, a minimum amount of sparrow habitat be protected from unusually high or low water levels;*
>
> *(2) By May 1, 1999, a fire management plan be initiated;*
>
> *(3) Between March 1, 2000, and 2003, incrementally increase protections from unusually high or low water levels; and*
>
> *(4) Annual reports must be submitted detailing progress implementing the RPA. Other reasonable and prudent measures and recommendations were discussed.*

The USACE began efforts to comply with the requirements of the 1999 Biological Opinion by changing operational schedules for certain structures in WCA-3A. USACE built water impoundment structures along the C-111 canal system, and by moving water east along the L-29 Canal and south through the L-31 Canal to avoid discharging water from WCA-3A directly into Western Shark Slough during Sparrow nesting season (ISOP, or *Interim Structural and operational Plan*). At the same time, it began studies aimed at longer-term improvements in operation of the system. Operations under ISOP (1999, 2000) and the Interim Operational Plan (IOP, 2002-present) are believed to have met the requirements of the Biological Opinion, amended in 2002. These IOP operations allow stages in the L-29 canal to rise higher than they did under the Experimental Program, in part necessitating changes in the Tamiami Trail structural modifications. Under IOP, stages in L-29 have risen as high as 8.9 ft, although average stages are lower.

1.5.4 General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area, July 2000

This document evaluated an array of alternatives and recommended a partial buy-out alternative for providing flood mitigation to the 8.5 SMA of the east Everglades (8.5 SMA), a residential area bounded on the west by ENP and

separated from urban lands to the east by the L-31N flood protection levee and borrow canal. The 8.5 SMA was eligible for buyout under the 1989 Everglades Forever act, but the same law had directed the USACE to provide flood mitigation to the extent practicable to this more densely developed area. The 8.5 SMA GRR/EIS evaluated many alternatives including complete buyout, complete flood mitigation and several partial-mitigation alternatives that included buyout of the most frequently flooded areas. The 2000 Recommended Plan (Alternative 6D) was a combination alternative requiring buyout of those properties that could not practicably be protected without further adverse effects on park wetlands in NESS and construction of seepage control and surface flood mitigation features for the higher lands that could be provided. A Record of Decision selecting Alternative 6D was signed on December 6, 2000. The 8.5 SMA plan was challenged in court due to ambiguous language in the Mod Waters authorizing law, but Congress provided a remedy in 2003 by re-authorizing the selected plan, Alternative 6D. This part of the Mod Waters project is currently under construction. Until all the 8.5 SMA features are built, operators of the system cannot fully rehydrate NESS. The current system operating plan (IOP) will allow more flows as soon as 8.5 SMA construction is complete and Tamiami Trail is raised and bridged.

1.5.5 General Reevaluation Report and Final Supplemental Environmental Impact Statement, Tamiami Trail Modifications, December 2003

This study evaluated eight alternative plans to increase the overall cross-sectional area of openings under the highway for passage of water from the Tamiami Canal (L-29 Canal) south to ENP in order to minimize the backwater effect caused by flow restrictions under the current configuration. This would limit the maximum rise in water level in the canal under the MWD peak design flow. Peak design flow is the authorized total capacity of all of the structures capable of discharging water into the L-29 Borrow Canal (L-29BC). The structures evaluated under the 2003 GRR are: spillways S-333 (1,150 cubic feet per second [cfs]), S-355A (1,000 cfs), S-355B (1,000), and S-356 (950 cfs authorized). Peak stages were modeled using the above capacities and the South Florida Water Management Model to estimate the 100-year recurrence interval flood based on the long-term meteorological record.

The alternatives included adding additional culverts under the highway, constructing one or more bridges within or outside the existing highway right-of-way, or elevating the highway for the full 10.7-mile section within the project area. Additionally, each alternative included an option to provide treatment of storm water runoff from reconstructed portions of the highway. The plan recommended in 2003 was a 3,000-foot bridge without water quality

treatment features, with its western terminus sited between the Blue Shanty Canal at Everglades Safari Park and the Airboat Association of Florida facility. Although the integrated GRR/EIS acknowledged that the recommended plan was not as environmentally beneficial as longer bridges or a totally elevated roadway, cost analysis identified the 3,000 foot option as the most environmentally beneficial option under the then-available budget.

1.5.6 Final Revised General Reevaluation Report/Second Supplemental Environmental Impact Statement, Tamiami Trail Modifications, November 2005

At the time that the GDM and FEIS on MWD were issued in 1992, it was believed that the culverts under Tamiami Trail were sufficient to pass the increased volume of water from the L-29 Canal on the north side of Tamiami Trail into ENP to the south without collateral effects. Later, new modeling predicted higher water levels that could damage the highway subgrade and, in extreme conditions, overtop the road. Furthermore, increased costs of construction materials required reanalyzing tradeoffs of benefits and costs for alternative plans. For these reasons, the 2003 GRR/SEIS Recommended Plan was withdrawn and an alternative analysis under NEPA was updated through the preparation of the 2005 RGRR/SEIS. The RGRR/SEIS Recommended Plan calls for a bridge up to two-miles long located at the western end of the project corridor, a bridge up to one-mile long at the eastern end, and raising the profile of the unbridged portions of Tamiami Trail with an asphalt overlay. The project would provide sufficient conveyance to enable the restoration of wetlands of NESS within ENP by subsequent water management projects. A Record of Decision selecting the Recommended Plan of the RGRR/SEIS was signed on January 25, 2006.

1.5.7 Interim Structural and Operational Plan (ISOP) for the Hydrologic Compliance with the Cape Sable Seaside Sparrow Biological Opinion for the Year 2000, 8 December 1999

This report detailed operations and actions consistent with the requirements of the Reasonable and Prudent Alternative (RPA) of the biological opinion for the year 2000 for each of the listed sparrow subpopulations. The actions are directly linked to hydrologic conditions as affected by the operation of the C&SF Project. The ISOP document supported emergency actions to protect the CSSS, including building a pump station and impoundment, just east of ENP and south of the 8.5 SMA, to allow conveyance of water eastward along L-29, down the L-31 Canal and back adjacent to ENP, thus offsetting the inability to discharge directly from WCA-3A into Western Shark River Slough. ISOP was a first step in changing structures and operations to offset the closure of the S-12 structures, required by the sparrow biological opinion,

during CSSS nesting season. ISOP structures include the S-332B pump station and the S-3323B west reservoir. These structures and operations proved insufficient to rehydrate the easternmost sparrow habitats inside ENP, and the storage provided was deemed inadequate to accommodate the desired volumes of water to be conveyed around the loop created, leading to further operational plan modifications beginning in 2001. The next phase of plan development and engineering evaluation was through a formally mediated process mandated by the Council on Environmental Quality (CEQ) after the parties were initially unable to reach consensus on structural and operational changes needed to meet the biological opinion requirements for Everglades Restoration. Numerous alternatives were formulated, evaluated through modeling and reviewed. A final plan was developed in late 2001, involving accelerated construction of authorized structures in the C-111 basin, to provide additional water impoundment capability and deliveries to ENP, rehydrate eastern sparrow habitat, and offset closure of the S-12s at the south end of WCA-3A.

1.5.8 Final Environmental Impact Statement, Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow, May 2002

C-111 and Mod Waters operations were further modified after the IOP studies were completed. These operations were developed through a protracted and difficult collaborative effort among the SFWMD, FWS and ENP biologists, and USACE engineers and biologists. The recommended plan, Alternative 7R, (ROD signed July 2002), was a consensus solution involving changes in operations and construction of several additional C-111 pump stations and impoundments. This is the current operating plan. A part of the IOP structures has not been built but is expected to begin construction soon. This portion depended on an exchange of lands between the SFWMD and ENP, which occurred recently.

1.5.9 Final Supplemental Environmental Impact Statement, Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow, December 2006

The Draft Supplemental Environmental Impact Statement (DSEIS) discusses output of modeling of Alt 7R, consequences of implementing this alternative (the Selected Plan) during the years 2002-2005, and compares modeled performance of Alt 7R with observed rainfall and operational effects on water stages at various points in the system. It also provides details of the structures built under Alt 7R but authorized under the C-111 Project authorization. It describes IOP features still to be built and their operations, which are anticipated to last until all parts of the MWD project are built, including Tamiami Trail, 8.5 SMA and the Conveyance features of Mod

Waters. The United States District Court for the Southeastern District of Florida Miami Division required the USACE to issue this Supplemental EIS for the Final EIS (FEIS) on IOP issued in May 2002. The USACE' NEPA analysis for the DSEIS included hydrologic modeling results that were not available at the time the FEIS was issued and the ROD signed, timeframes for implementing IOP, actual data collected since IOP implementation, and an analysis of the incorporation of previously authorized Alternative 7R structural features, as described in the 1992 Modified Water Deliveries to Everglades National Park report and the 1994 C-111 reports. The Final SEIS began public coordination December 22, 2006, and its comment period ended on February 5, 2007.

1.5.10 Draft Environmental Impact Statement, Combined Structural and Operational Plan (CSOP)

The full operational plan for the Mod Waters and C-111 Project features will be the Combined Structural and Operational Plan, or CSOP, now under development. CSOP will operate the fully built MWD and C-111 systems until operations are further modified under CERP. CSOP cannot begin to regulate the system until all elements of the MWD project, including the conveyance control features to be built between WCAs 3A and 3B, as well as any seepage control structural changes (augmentation of S-356, if needed) are built and operational.

1.5.11 Everglades National Park General Management Plan and Environmental Impact Statement

The GMP for ENP will provide a broad conceptual framework to guide decisions for long-range park management, resource protection, appropriate types and levels of visitor activities, and appropriate facility development. The management plan will articulate the park's mission, purpose, and significance, and define the resource conditions and visitor experiences that should be achieved and maintained over time. The plan will consider ENP both as a unit of the national park system and in a broader ecosystem context that includes the surrounding South Florida region.

In 2006, the East Everglades Wilderness Study (EEWS) was added to the GMP/EIS. Analysis of commercial airboat tours and operations in ENP and any potential future concessions contracts between ENP and commercial airboat tour operators would be determined in the GMP/EEWS/EIS process. No decision has been reached to determine whether or to what extent commercial airboat concessions will be authorized and implemented during the 20-year time span of the GMP.

The ROD for the GMP/EEWS/EIS, expected in 2009, could include a recommended wilderness proposal for the East Everglades Expansion Area.

Section 2.0
ALTERNATIVES

2.1 INTRODUCTION

Alternative plans for this project have been studied in depth. In the evolution of this project, three sets of alternative plans were developed and evaluated to modify the Tamiami Trail to accommodate the passage of MWD flows from the L-29 Canal to ENP. Initial plans for roadway protection involved two plans; 13 preliminary alternative plans were subsequently developed by an interdisciplinary team; eight alternatives were evaluated in the 2003 GRR/SEIS; and nine alternatives were considered in the 2005 RGRR/SEIS. Extensive arrays of evaluation criteria have included adverse and beneficial environmental and socioeconomic factors, as well as additional considerations and programmatic limitations:

- **FHWA and FDOT Requirements.** This project involves the modification of U.S. Highway 41. The completed project must provide the public a facility that meets the highway standards required by the Federal Highway Administration (FHWA) and the FDOT. FHWA has advised that the provisions of Section 4(f) of the Department of Transportation Act of 1969 do not apply to this project (Appendix C).

- **Florida Coastal Zone Management Program.** This project is located within the designated Coastal Zone of the State of Florida. Therefore, it is necessary for the project to comply with the requirements of the Florida Coastal Zone Management Program. Part of that program involves the State (FDEP) concurrence with a USACE determination that the project is consistent with the Florida Coastal Management Plan.

- **Flood Control.** This project must not adversely affect the ability of any channels or structures to provide currently authorized flood control levels.

- **Other MWD Components.** This project is a component of the overall MWD Program. Therefore, the project must maintain full consistency with the other MWD component projects.

- **Use of the Tamiami Trail for Hurricane Evacuation.** The highway's use for hurricane evacuation requires that traffic flow not be

impeded during hurricane season. This may influence construction phasing and/or means to maintain traffic flows during construction.

- **Hydraulics and Hydrology.** Actions should not result in any significant reduction in the capacity of the L-29 Canal to provide conveyance and equalization of flows.

- **Compatibility with Future CERP Actions.** WRDA 2000 § 601(b)(2)(C) authorized raising and bridging of Tamiami Trail as an "Initial Project" of CERP. It is necessary, therefore, to ensure that modifications to Tamiami Trail should be compatible with the anticipated CERP features. Implementation of CERP may result in higher flows and higher stages of water than would be provided by MWD. Alternatives should enhance implementation of potential future CERP actions that may include such actions as removal of the L-29 Levee, filling of the L-29 Canal, or the removal or degradation of other structures that may be deemed to be impediments to hydrological or ecological connectivity or the restoration of sheetflow. Although alternatives should minimize any retrofit required for implementation of CERP objectives, the MWD project does not preclude any future modification, retrofit, or removal of any structure or facility associated with the modification of Tamiami Trail if such action is necessary to promote the hydrologic restoration of ENP and the South Florida ecosystem.

- **Osceola and Tigertail Camps**. Two Miccosukee Tribe of Indians family group settlements are located within the project area: the Tigertail Camp and the Osceola Camp. Increased flows to ENP would result in higher water stages that would have had a potential for flooding the settlements. Facilities at the Tigertail Camp were elevated by the USACE to a level above water stages anticipated for MWD. Similarly, ENP is currently coordinating with the Miccosukee Tribe of Indians to raise facilities at the Osceola Camp.

All the alternatives previously evaluated would have accommodated the same flows and, therefore, the same water levels. Effects of the increased water levels on private parcels would not differ. The same estates would be needed for all alternatives. Deferring the decision of real estate to ENP and the future did not differentially affect the selection of the Recommended Plan. Therefore, there is no reason to further consider the prior alternatives that were addressed in the RGRR.

2.2 PROPOSED PROJECT

The project proposed for construction is the Recommended Plan of the 2005 RGRR/SEIS. Bridge and highway dimensions, locations, and configurations would be retained (Figure 1). The proposed project would consist of constructing two bridges and reconstructing the highway to raise the crown elevation. Real estate interests along the south side of the highway would be acquired by ENP before construction commenced.

A two-mile bridge in the western portion of the project area and a one-mile bridge in the eastern portion of the project area would be constructed. The western two-mile bridge would actually be a conveyance of two individual bridges. A sloped bridge is required to collect runoff for treatment; to provide for the necessary slope, the two western bridges would reach ground level in the approximate center. At this location, the access road to Lincoln Financial Media would intersect the highway.

The plan would create hydraulic conveyance openings through Tamiami Trail by removing up to three miles (cumulative) of the existing highway, embankment, and associated culverts (Figure 4). Bridges would be constructed over each opening to replace the removed section of highway. The eastern bridge would start approximately one mile west of S-334 and proceed west approximately one mile, ending approximately 3,000 ft east of Radio One. The western bridge would start approximately 1,200 ft west of the S-12 Telemetry Tower and proceed west approximately two miles, ending approximately 2,640 ft east of the Osceola Camp (Figure 1).

The western bridges would result in the removal of the S-5, S-7, and S-9 culvert sets (a total of nine culverts) (Figure 4). The eastern one-mile bridge span would result in the removal of the S-16 and S-17 culvert sets (six culverts) (Figure 4). Construction of the bridges and bridge approaches would reduce the number of culverts sets from 19 (55 individual culverts) to 14 (40 individual culverts). The remaining culverts would require lengthening to extend beyond the widened roadway.

FDOT requires the ability to get under its bridges for visual inspections using a truck-mounted device with a basket for inspectors. A minimum under-bridge clearance would be required for FDOT to employ this device at each end of each bridge. In addition, a slope is required for the collection of stormwater runoff from each bridge for treatment. Therefore, the highest point of each bridge would be in the center.

The crown elevation of the unbridged portions of the roadway would be raised to approximately 12.3 ft NGVD. In meeting with current FDOT standards

for roadway geometry, the raised profile of the roadway would require a wider roadbed than currently exists and a wider embankment on the southern edge of the road to stabilize side slopes. The reconstructed roadway would consist of two 12-foot-wide travel lanes. On each side of the roadway would be a 10-foot-wide shoulder, five feet of which would be paved. Guardrails would be located at the outer edges of the shoulders.

2.2.1 Additional Features

The proposed project includes features not considered in the 2005 RGRR/SEIS. The first is the possible installation of culvert maintenance/flow equalization swales placed at each of the 15 sets of culverts that would remain after construction of the bridges. These swales would be 30 feet wide and extend up to 500 feet to either side of each culvert set (Figure 4). All vegetation would be removed, and the unconsolidated material (e.g., peat) above the rock would be excavated, creating a swale with a depth approximately two feet lower than the surrounding area.

The SFWMD has determined that the swales are needed to provide increased flow equalization; they would also assist in maintaining flows through the culverts by inhibiting the build-up of vegetation in front of the culverts. The USACE has concurred that the swales would be beneficial. The decision on whether to install the swales lies with ENP, and discussions and evaluations are ongoing.

The second feature involves the possible acquisition of an additional five feet of right-of-way on the south side of Tamiami Trail to comply with FDOT safety requirements. The proposed swales south of the highway meet the FDOT definition of canals. According to the FDOT Plans Preparation Manual, Volume 1, for rural highways with design speeds of 50mph or greater that parallel canals, the distance from the travel lane to the top of the canal side slope must be no less than 60 feet. If it is not possible to meet that criterion, a guard rail must be installed five feet from the canal side slope. ENP may request that the USACE solicit a variance of the five-foot distance requirement from FDOT and allow the guard rail to be constructed at the edge of the Tamiami Trail highway embankment, which is also the top of the canal side slope.

A third feature is a 40-foot-wide construction easement along the southern side of each of the bridges. Vegetation would be removed from the easements to facilitate mobility and operation of cranes and other heavy equipment required to construct the bridges. Details of this feature are currently being coordinated with ENP.

2.2.2 Anticipated Water Levels

The design of the proposed highway and bridges was based on water elevations modeled by the Natural System Model (NSM Version 4.6.2). The NSM was used to determine average annual flows to NESS across Tamiami Trail for the CSOP and CERP Decompartmentalization project.

The NSM model predicts daily average stages based on simulating observed rainfall data from the years 1965 to 2000. The water stages predicted by the NSM would account for the full range of possible seepage and conveyance feature configurations that are being considered for the Combined Structural and Operational Plan (CSOP) and subsequent Comprehensive Everglades Restoration Plan (CERP) WCA 3A/3B Decompartmentalization project. This approach is believed to be a prudent design for Tamiami Trail because the design would be compatible with future restoration projects that are part of CERP.

For validation of this approach, Figure 6 compares the stage duration curves at the L29 Canal location for CERP and alternatives considered under CSOP against the NSM simulation. This figure shows that the NSM stage levels at Tamiami Trail are higher than those expected based on current CSOP and CERP modeling, representing a conservative approach to the design high water for the pavement design. The figure shows that 50 percent of the time the water elevation (stage) for the existing conditions equaled or exceeded 7.2 ft. Under MWD and CERP flows, the NSM predicts that water elevations are expected to equal or exceed 8.0 ft 50 percent of the time.

A separate frequency analysis was performed with the existing and with-project model outputs (Figure 7). Based on this analysis, the 100-year stage duration for the with-project condition was 10.1 ft. A 100-year stage is a water elevation that has a one percent chance of being equaled or exceeded during any year. Analyses showed that a 20-year stage would be 9.7 ft under MWD and CERP flows. These data provided the basis for raising the Tamiami Trail so that the road would not be damaged or overtopped after implementation of the MWD project.

To protect Tamiami Trail from the higher water elevations predicted for the MWD project, the road would be raised and widened. The raised and widened roadbed would encroach upon ENP and privately owned parcels of land on the south side of Tamiami Trail.

2.3 NO-ACTION ALTERNATIVE

Interests in all lands outside the existing Tamiami Trail right-of-way required for construction would be acquired by the ENP. Information on exactly what property would be required for acquisition was insufficient at the time of preparation of the 2005 RGRR/SEIS, but it was assumed that businesses would lose parking area. Induced flooding from increased MWD flows was not considered an issue in the 2005 RGRR/SEIS.

The 2005 RGRR/SEIS assumed that the NPS would acquire the necessary real estate interests in private parcels of land adjacent to the south side of Tamiami Trail before the initiation of construction of the Tamiami Trail project and before initiation of ecosystem restoration water flows directed south into ENP under the Combined Structural and Operational Plan (CSOP). However, because the NPS must complete its General Management Plan (scheduled for completion in 2009) before it can proceed with real estate acquisitions, it is unable to meet the schedule for Tamiami Trail construction.

However, postponement of the acquisition of real estate interests would enable the airboat touring businesses on the southern side of the highway to remain open for at least two more years. Additionally, postponement would provide ENP with the opportunity to make a decision on retaining the airboat touring businesses as concessions within the ENP.

The No-Action Alternative would postpone the overall Everglades restoration effort by at least two years.

2.4 TENTATIVELY SELECTED PLAN

The 2005 RGRR/SEIS addressed the USACE need to acquire a real estate interest in portions of the private properties that would lie within the construction footprint of the reconstructed road and bridges and the disposition of the utilities within the road right-of-way. Subsequent to the completion of the 2005 RGRR/SEIS, the USACE completed a detailed land survey of the project corridor, and the engineering designs of the project have proceeded. These advancements have allowed the USACE to complete a more accurate determination of real estate needs than was possible in the 2005 RGRR/SEIS.

The Tentatively Selected Plan (TSP) is for the Corps to proceed with acquisition of real estate interests, which is scheduled to begin in 2007.

2.4.1 Introduction.

The 2005 RGRR/SEIS considered real estate interests needed to expand the highway to the south of the existing roadway embankment. Those determinations were based on aerial photography, preliminary surveys, and preliminary engineering designs.

Subsequent to the completion of the 2005 RGRR/SEIS, the USACE completed a detailed land survey of the project corridor, engineering designs of the project have been refined, and tentative real estate actions are being evaluated in a Revised Real Estate Report. These advancements have allowed the USACE to complete a more accurate determination of impacts to properties in the project corridor than was possible in the 2005 RGRR/SEIS. This section discusses and summarizes the differences between estimates of property impacts in the 2005 RGRR/SEIS and a revised determination of impacts in this Third Supplemental EIS, including real estate needs and estates.

The 2005 RGRR/SEIS did not address induced flooding impacts that would result from the increase in water elevation and hydroperiod after implementation of the MWD project. The Federal Action that formed the basis for the 2005 RGRR/SEIS was the construction of bridges to convey MWD flows from the L-29 Canal to ENP and reconstruction of the highway to account for higher water elevations. Potential flooding impacts on properties were considered to be a function of the operation of water control structures to manage flows and were therefore not evaluated.

The USACE has scheduled the acquisition of real estate interests to begin in 2007.

2.4.2 Private Land Acquisitions

The Federal Government would acquire private land affected by induced flooding for the MWD project and/or by highway and bridge construction. The Corps analyzed the seven land parcels adjacent to the south side of Tamiami Trail to determine whether structural solutions would be more cost effective than real estate acquisition. If the cost of structural solutions exceeds the fair market value of the property, it is in the best interest of the government to acquire the property in fee. Otherwise, rights-of-way for highway construction would be acquired in fee and, at a minimum, a perpetual flowage easement would be obtained from the owners. A fee gives the government the right-of-way in, on, over, and across the land for construction and maintenance activities of the Tamiami Tail. A perpetual flowage easement secures the government the right to permanently flood

land lying below elevation 10.1 ft (NGVD 29) in connection with the operation and maintenance of the MWD project.

Below is a summary of newly evaluated real estate for each of the seven parcels of privately owned land. Property impacts estimated in the 2005 RGRR/SEIS are included as points of comparison.

1. Lincoln Financial Media: The property would be affected by induced flooding associated with the MWD project. For the facility to remain in operation, modifications would be required to existing structures and access roads as well as communication towers and buildings. If it is determined during the appraisal process that costs for these structural solutions is more economical than acquiring the property through fee, a perpetual flowage easement would be required. Acquisition of the property through fee may include not only the tract along Tamiami Trail but also its "greater estate," which would include broadcast studios and other facilities associated with radio transmissions. This will be determined through additional appraisals as the project progresses. If the structural solution and flowage easement is the selected real estate action, it would be necessary to raise the elevation of the access road to intersect the elevated Tamiami Trail. The need to maintain stable side slopes alongside the elevated access road would create a wider road base. This may be mitigated through the use of retention walls alongside the access road. These details will be decided upon as the project develops.

   The 2005 RGRR/SEIS stated there was not enough information to determine what estate would be acquired for acquisition of this property. Consideration for the justification for any ramps to access Lincoln Financial Media was expected to be addressed in the Preliminary Engineering and Design (PED) phase of this project.

2. Everglades Safari Park: The tract's parking lot and some structures would be eliminated to construct the bridges (Figure 8). Furthermore, large portions of the property are expected to flood at the 50 percent daily stage duration of 8.0 ft (Figure 8). Under water flows associated with the MWD project, water elevations are expected to equal or exceed 8.0 ft 50 percent of the time. The property is expected to endure more extreme flooding at both the 10-year and 100-year stage frequencies for MWD operations (figures 10 and 11). It would

therefore be necessary for the government to acquire the property in fee.

The 2005 RGRR/SEIS stated that the western bridges "may affect the day-to-day operations of the Everglades Safari." That report stated there was not enough information to determine what estate would be required for acquisition of Everglades Safari. Consideration for the justification for any ramps to access the property was expected to be addressed in the Preliminary Engineering and Design (PED) phase of this project.

3. Airboat Association of Florida: Additional right-of-way required for construction of the TSP would encroach on this property, but Association members would continue to have access. The USACE proposes to obtain additional right-of-way in fee and a minimum of a perpetual flowage easement for the remainder of the Airboat Association property.

   The 2005 RGRR/SEIS forecasted that this property could possibly be affected by the project. The report stated that there was "insufficient information available to determine the exact estate(s) necessary for the project with the exception of a perpetual road easement along the northern boundary of that tract of land."

4. Gator Park Airboat Tours: This business would lose a portion of its parking lot immediately adjacent to Tamiami Trail for construction of the TSP (Figure 12). Additionally, some of the property would be affected by the 50 percent daily stage duration of 8 ft (Figure 13). The property would incur extensive flooding during the 10- and 100-year stage frequencies associated with MWD operations (figures 14 and 15). Pending completion of real estate assessments, the most likely action appears to be the securing, at a minimum, a perpetual flowage easement. Property for construction of the highway would be acquired in fee.

   Information about this property was insufficient at the time of the 2005 RGRR/SEIS to determine exactly what estate would be required for acquisition of this property. The report forecasted that the necessary real estate interests, if any, would be developed during PED.

5. Coopertown Airboat Tours and Restaurant: The parking lot would need to be taken to widen Tamiami Trail, and the business would not be able to operate during construction (Figure 16). Additionally, the property would be affected by induced flooding at the 50 percent daily stage duration (Figure 17) and the 10- and 100-year stage frequencies (figures 18 and 19). It would be necessary for the government to acquire the land through fee.

   Information about this property was insufficient at the time of the 2005 RGRR/SEIS to determine exactly what estate would be required for acquisition of this property. The report forecasted that the necessary real estate interests, if any, would be developed during PED.

6. Radio One Communications: The property would be affected by induced flooding associated with the MWD project. For the facility to remain in operation, modifications would be required to the existing structures and lands, including access roads and communications towers. If it is determined during the appraisal process that costs for these structural solutions is more economical than acquiring the property through fee, a perpetual flowage easement would be required. Acquisition of the property through fee may include not only the tract along Tamiami Trail but also its "greater estate," which would include broadcast studios and other facilities associated with radio transmissions. This will be determined through additional appraisals as the project progresses.

   If the structural solution with flowage easement is the selected real estate action, it would be necessary to raise the elevation of the access road to intersect the elevated Tamiami Trail. Property on which the access road is located is owned by ENP. An easement for the access road was granted to Radio One by the previous owners of the property. The need to maintain stable side slopes alongside the elevated access road would widen the construction footprint beyond the existing easement. This could be mitigated through the use of retention walls alongside the access road. These details will be decided upon as the project develops. If further analysis shows that the road must be widened and ENP does not allow such widening, the road could not be elevated, and it would be necessary to acquire the property through fee.

Information about this property was insufficient at the time of the 2005 RGRR/SEIS to determine exactly what estate would be required for acquisition of this property. The report forecasted that the necessary real estate interests, if any, would be developed during PED.

7. Florida Power and Light: Property for highway construction would be acquired in fee. Additionally, a minimum of a perpetual flowage easement would be needed at the 100-year stage for restored water flows.

   Information about this property was insufficient at the time of the 2005 RGRR/SEIS to determine exactly what estate would be required for acquisition of this property. The report forecasted that the necessary real estate interests, if any, would be developed during PED.

2.4.3 Construction Relocations

There are five businesses and two potential owner occupied residential structures located within the project area that appear to be eligible for relocation assistance benefits under Public Law 91-646. In addition, Gator Park has numerous tenants who may be entitled to relocation assistance benefits.

2.4.4 Public Highways and Bridges

There are no additional non-project-related relocations of public highways or bridges affected.

2.5 RETAINING BUSINESSES

Section 103(d) of The Everglades National Park Protection and Expansion Act of 1989 ("the Act"), which addresses the possible retention of airboat tour businesses as ENP concessionaires, states:

> *Section 103(d) CONCESSION CONTRACTS- The Secretary [of Interior] is authorized to negotiate and enter into concession contracts with the owners of commercial airboat and tour facilities in existence on or before January 1, 1989, located within the addition for the provision of such services at their current locations under such rules and conditions as he may deem necessary for the accommodation of visitors and protection of biological resources of the area.*

Property on which the businesses are located is anticipated to eventually be purchased and incorporated into ENP. In compliance with the Act, the Park has begun to consider and evaluate retaining the existing businesses as concessionaires (see Section 1.5.11). The Park plans to include the decision on whether to enter into concession contracts with the businesses in its General Management Plan update. However, completing the plan will likely require approximately two years, which is beyond the Corps schedule for acquiring real estate interests and starting reconstruction of Tamiami Trail.

The Park has requested that the Corps investigate, and discuss in the SEIS, various possibilities to allow the three airboat tour businesses to remain in operation along Tamiami Trail until the ENP is able to complete its evaluation of concession contracts and the General Management Plan. Among the considerations requested by the Park was that the Corps acquire the properties and allow the businesses to remain in operation until the Park completes its determination on the fate of the businesses. However, the Corps does not have the authority to enter into such lease arrangements or outgrants. Normal practice is for the Corps to close and demolish all facilities on property it acquires to avoid any legal liability from access by the public. The Corps anticipates turning over title of the properties to the NPS at the end of project construction (ca. 2011). Closing the businesses and demolishing the facilities by the Corps would likely take place unless the NPS takes possession of and accepts title to the properties immediately after the Corps obtains it. If the NPS is able to accept title, the businesses might be able to stay open through construction unless road realignment impacts make that impractical.

The following were considered to possibly offset highway realignment impacts sufficiently to allow the businesses to remain in operation pending the Park's decisions in their GMP. It should be noted that in addition to impacts associated with the highway realignment, completion of the project and implementation of MWD flows would increase the likelihood for flooding impacts. However, for the purposes of this evaluation, flooding impacts are not considered. After receiving title, NPS can determine whether to accept the flooding risk in order to allow businesses to maintain operations.

2.5.1 Everglades Safari Park

Everglades Safari lies adjacent to the proposed location of the western bridges (Figure 1). Construction of the bridges would block vehicle access to the property and eliminate the parking area and some of the structures. MWD flows would subject the remainder of the property to periodic flooding (figures 8, 9, 10 and 11).

The following proposals to allow Everglades Safari to continue operation were considered:

1. Move the physical location of the business to the north side of the Tamiami Canal. This action may not be permissible under the provision of the Act requiring the business to operate at its current location.

2. Shorten the western bridges by moving the eastern terminus further west, away from Everglades Safari. Shorter bridges would result in a reduction in the conveyance of MWD flows into ENP and reduce the ecological performance associated with increased flows, a condition that the Park finds unacceptable.

3. Relocate the western bridges farther to the west to avoid impacts to Everglades Safari. Bridge relocation would not alleviate impacts to Everglades Safari. Reconstruction and raising of the highway in front of the business would require most of the area used for parking. In addition, there would be a two-foot drop in elevation from the edge of the new right-of-way to the remaining parking area. The introduction of MWD flows would result in periodic flooding of the site (figures 9 to 11).

4. Fill adjacent Park lands to provide high land for replacement parking and other facilities eliminated by construction of the bridges. The filling of ENP wetlands to promote airboat tours would require approval by the Park and other agencies and may violate the provision of the Act requiring the business to operate at its current location.

5. Allow the business to relocate to the site of the former Frog City airboat tour business, which is now owned by ENP. Again, relocation of the business may violate the provision of the Act requiring the business to operate at its current location.

6. Provide a parking area north of the S-333 structure and shuttle visitors by airboat in the L-29 Canal and under the new bridges to the remaining facility, which would essentially be an island. This action would require a lease between Everglades Safari and SFWMD, the owner of the property where parking is proposed. Whether SFWMD would grant such a lease is highly questionable. Airboat traffic in the L-29 Canal would create noise levels likely unacceptable to the residents of the Osceola Camp. The isolation of the remainder of the facility raises such concerns as logistics (e.g., fuel, emergencies, etc.) and economic viability.

7. Assuming that Everglades Safari can compensate for the loss of structures from construction of the bridges, elevate the remaining facilities above the 100-year flood stage. Costs to elevate the structures appear likely to exceed the cost of acquiring the property in fee, which under Corps regulations would require fee acquisition.

8. Purchase the property in fee. Government acquisition of the property would provide funds that could be used by the owner to possibly relocate his business elsewhere in the Everglades. However, this would not serve the objective of promoting ecotourism within the Park.

The Corps has been unable to identify, with certainty, a means to allow Everglades Safari Park to remain in operation. Accordingly, it appears that fee acquisition of the property is the only available option that would allow Tamiami Trail construction to go forward.

2.5.2 Gator Park Airboat Tours

Reconstruction of the highway that shifts the existing right-of-way south by about 60 feet would result in Gator Park losing a large portion of its parking area adjacent to Tamiami Trail (Figure 12). In addition, periodic flooding of the property would occur (figures 13 to 15).

A pending appraisal of the property will determine the cost to acquire the property in fee, as well as the "cost to cure," which is the cost to flood-proof the facilities either by elevating buildings or by other means. This must be capable of being implemented within the property boundaries. If the cost to cure exceeds 75 percent of the cost to acquire the property in fee, the Corps will make a determination of which real estate interest to acquire. The cost-to-cure alternative would entail acquisition of a perpetual flowage easement over the property by the Corps. The property owner could then use these funds to flood-proof the property as he sees fit; the Corps would not take part in this process. The only Government requirement would be that there could not be any human habitation below the 20-year flood elevation (9.7 feet) within the flowage easement area, with or without flood-proofing. This would likely require removal of some or all of the existing RV facilities at the rear of the property,

If the property is acquired in fee, the owner could be provided with benefits to relocate the business.

It is not possible to determine with certainty what real estate interest will need to be acquired by the Corps until the appraisals are completed later this

year. Gator Park seems to present the best possibility of the three businesses to remain operational (pending completion of the Park's GMP) by virtue of its location relative to the shift in highway alignment and the size and topography of the property.

2.5.3 Coopertown Airboat Rides and Restaurant

Reconstruction and raising of the highway in front of the business would require most of the area used for parking (Figure 16). There would be a two-foot drop in elevation from the edge of the new right-of-way to the remaining parking area. The introduction of MWD flows would result in periodic flooding of the site (figures 17 to 19).

Alternatives that were evaluated to possibly allow Coopertown Airboat Rides to remain in business include:

1. Establish a parking area on the L-29 Levee, where visitors could use the existing pedestrian bridge to access the business. This action would require a lease between Coopertown and SFWMD, the owner of the property where parking is proposed. The unpaved levee road, while adequate to support an occasional vehicle, is not designed to handle an increased volume of traffic. It is questionable whether visitors would elect to drive on a one-lane unimproved road to access the business. There is also a safety issue of pedestrians having to cross the highway to get to the airboats from the pedestrian bridge. This does not seem to be a practical alternative.

2. Conduct a land exchange with ENP to enable affected facilities to be relocated away from the highway. The Corps recommends that ENP evaluate this proposal as part of its update of the ENP General Management Plan.

3. Shift the highway alignment in front of the business to the north, closer to the L-29 Canal, to reduce impacts on the parking area and buildings. The cost of constructing the highway closer to the edge of the L-29 Canal would require retaining walls at additional costs that would likely exceed the value of the business. This would not be considered part of the cost-to-cure since it lies outside the property boundaries. It would add several million dollars to the cost of the project, which would have to be acceptable to the NPS.

4. Acquire a flowage easement and allow the business to be rebuilt on existing land not affected by reconstruction of the highway. Because

of the likelihood of extensive flooding, a flowage easement is considered impractical.

5. Raise the property with fill. The cost of fill material would exceed the cost of acquiring the property through fee.

6. Purchase the property in fee. Government acquisition of the property could enable benefits to allow the owner to relocate his business.

The Corps has been unable to identify a means to enable Coopertown Airboat Rides to remain in business. Based on available information, it is concluded that there is no viable option to acquiring the property in fee.

2.6 COMPARISON OF ALTERNATIVES

The primary difference between the No-Action alternative and the TSP involves the timing of the real estate actions.

ENP Environmental Resources. The No-Action Alternative would promote the hydrologic restoration of ENP by providing additional passage of MWD flows and enhancing the hydroperiod. This same effect would occur under the TSP but with a potential difference in the timing of restoration. By proceeding with real estate acquisition to meet the schedule for Tamiami Trail construction, the TSP would expedite the onset of MWD implementation, thereby providing restoration benefits sooner than would be possible under the No-Action Alternative. Other than the time at which real estate interests would be acquired, impacts to ENP from the No-Action alternative and the TSP would be identical.

Cultural Resources. Culturally significant properties, including Coopertown and the Airboat Association of Florida, would be impacted by construction. The construction right-of-way required for reconstruction of the highway would result in the taking of Coopertown's entire parking area Additional right-of-way required for construction would encroach on property belonging to the Airboat Association. Impacts on cultural resources would be identical from both the No-Action Alternative and the TSP.

Businesses. Under both the No-Action Alternative and the TSP, six privately owned businesses along the south side of Tamiami Trail would be impacted through construction of the improved road and flooding at the 100-year stage (with a water elevation of 10.1 ft) associated with MWD water flows.

Construction impacts on businesses located adjacent to the road include the elimination of parking and fee acquisition of Everglades Safari, the

elimination of and fee acquisition of Gator Park's roadside parking, and the elimination of parking and fee acquisition of Coopertown. Right-of-way for highway construction would be acquired in fee from Radio One, Florida Power and Light, and Lincoln Financial Media.

Flooding associated with increased MWD flows would affect business operations. Pending completion of real estate appraisals, it appears that at a minimum, perpetual flowage easements would be acquired from Lincoln Financial Media, Radio One, Gator Park, and Florida Power and Light. Everglades Safari and Coopertown would most likely be acquired in fee and business operations would close.

Airboat Association of Florida. Under both the No-Action Alternative and the TSP, additional property necessary for construction of the highway would be acquired from the Airboat Association in fee. A minimum of a perpetual flowage easement would be necessary for the remainder of the property.

Tourism. The airboat businesses on Tamiami Trail draw a large influx of state, national, and international tourists to this area of ENP every year. Therefore, the effects of reconstructing the Tamiami Trail on these businesses could adversely affect the area's ecotourism industry. The closing of one or more of these businesses could significantly limit tourism options for many thousands of tourists.

Under both the No-Action Alternative and the TSP, construction impacts and right-of-way requirements would eliminate the existing parking facilities at Everglades Safari Park and Coopertown. Pending completion of real estate appraisals, it appears that Gator Park may be able to continue operations.

The inability of Everglades Safari Park and Coopertown Airboat Rides to continue operations would also be affected by increased flooding.

Section 3.0
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The affected environment section of this report describes the conditions as they currently exist. It is to these conditions that the alternative actions are applied to determine environmental impacts. The affected environment as described in the 2005 RGRR/SEIS is unchanged. This section provides a summary of the affected environment section of that report.

3.2 GEOLOGY AND SOILS

Florida bedrock is primarily limestone with stratigraphic thicknesses of more than 5,000 ft in the south. The Lower East Coast, which is located on the Atlantic Coastal Ridge, is underlain primarily by thin sand and limestones that are highly permeable and moderately well drained. The soil of the Tamiami Trail project area is mainly of the Lauderhill-Dania-Pahokee Association, which consists of nearly level, poorly drained soils containing organic material eight to more than 51 inches deep over limestone bedrock. These soils extend west from the Atlantic Coastal Ridge into the Everglades. Typically, the soils are black to dark brown muck underlain by soft porous limestone. These soils are characterized by high subsidence, ponding, excess humus, and low strength.

3.3 SURFACE WATERS

In the last 50 years, the construction of the C&SF Project has created many problems by converting nearly half of the original Everglades ecosystem to agricultural and urban uses. The hydrology of the remaining Everglades has become altered by the operation of the C&SF Project. The average annual flows and surface water stages have been reduced, and regional groundwater has been lowered. The frequency, duration, and magnitude of interannual wet and dry cycles have been changed, and salinity levels in estuaries have been altered. The construction and operation of the C&SF Project provided a network of canals and levees that have accelerated the spread of contaminants, sediments, and exotic species.

An unnatural mosaic of impounded, fragmented, and both over-inundated and over-drained marshes has been created throughout the system. More water now flows through canals to the east and less to ENP and Florida Bay than occurred historically. The altered timing of wet and dry cycles has resulted in water conditions that do not correspond to life cycles of native

species. Generally, the Everglades receives too much water during wet periods and too little during droughts. In wet periods, water is impounded in the WCAs and then discharged to Everglades or coastal canals. During dry periods, water can flow through the canals to coastal areas and bypass the wetlands.

3.3.1 Water Management

Florida law requires the designation of areas where water resources are critical or anticipated to become critical over the next 20 years as Water Resource Caution Areas. Much of South Florida, including the Everglades, has been designated as a Water Resource Caution Area.

The Clean Water Act requires that the surface waters of each state be classified according to designated uses. Florida has five classes with associated designated uses. WCA-3B is designated as Class III for recreation, propagation and maintenance of a healthy, well balanced population of fish and wildlife. Additionally, a water body may be designated as an Outstanding Florida Water (OFW), which FDEP defines as water worthy of special protection because of its natural attributes. ENP is designated in F.A.C. 62-302.700(9)(a) as an OFW.

Prior to 1989, in addition to rainfall, ENP received its inflow through the S-12 structures (S12A, B, C, and D). These structures are located west of L-67 Extension and deliver water to ENP from WCA-3A. In 1983, Congress authorized the Experimental Water Delivery program because of adverse environmental impacts to ENP resulting from high rainfall and water management practices in South Florida. In an attempt to remedy the location, timing and volume of water deliveries to ENP, the legislation authorized a series of seven tests using different water delivery schemes from the C&SF project to ENP. Most of these tests involve a "rainfall-based" delivery formula that specifies the amount of water to be delivered to ENP in weekly volumes through the S-12s (west of the L-67 extension) and S-333 (east of the L-67 extension). However, because of management constraints, S-333 usually could not deliver its required volume. Generally, the volume of flow that could not be delivered at S-333 was shifted back to the S-12s.

As part of the FWS 1999 Biological Opinion on the project, Reasonable and Prudent Alternatives (RPAs) were developed to "preclude jeopardy" to the Cape Sable seaside sparrow. These RPAs included a number of land and water management actions that have subsequently been implemented. One set of options required early, staged closure of the S-12 structures to avoid surface flooding in the sparrow's Subpopulation A nesting area and a redistribution of flows to the culverts located east of the L-67 Levee. By

March 2002, 60 percent of all regulatory water releases crossing Tamiami Trail were required to occur east of the L-67 Extension.

The South Dade Conveyance System, of which the structures and canals along eastern Tamiami Trail are components, is currently operated under the Interim Operational Plan (IOP), as described in the May 2002 IOP FEIS.

3.3.2 Water Supply

Levees and canals divide the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The natural areas consist of the three WCAs and ENP.

The primary purposes for the WCAs and their appurtenant levees, canals, structures, and pump stations include flood control, water conservation, prevention of saltwater intrusion, recreation, preservation of fish and wildlife, and water supply for urban and agricultural areas and ENP. The WCAs include about 1,400 miles of canals and levees, 181 major water control structures, over 2,000 minor control structures, and 18 major pumping stations. The WCAs are completely contained by levees, except for about seven miles on the western side of WCA-3A, which has a tieback levee. Levees on the eastern side of the Everglades also protect from inundation the agricultural and industrial areas that otherwise would be short hydroperiod wetlands. The main canals are West Palm Beach Canal, Miami Canal, Bolles and Cross Canals, North New River Canal, South New River Canal, Hillsboro Canal, and Tamiami Canal.

The WCAs provide detention for excess water from the agricultural area and parts of the east coast region and for flood discharge from Lake Okeechobee to the sea. The eastern levees prevent floodwaters from inundating the east coast urban areas; provide a water supply for east coast urban and agricultural areas and ENP; improve the water supply for east coast communities by recharging underground freshwater reservoirs; reduce seepage; and ameliorate saltwater intrusion in coastal aquifers. The east coast levees reduce the severity of the drainage of the Everglades caused by the major canal systems, such as the Miami Canal and North New River Canal, thus reducing impacts to fish and wildlife caused by the major drainage systems. These levees still function to impound the Everglades, precluding the historic flow patterns.

The maintenance of water levels in the WCAs essentially represents the seasonal and monthly limits of storage. The levels vary from high stages in the late fall and winter to low stages at the beginning of the wet season. This

permits the storage of runoff during the wet season for use during the dry season and serves to maintain and preserve the vegetative regimen essential to fish and wildlife and the prevention of wind tides. Reservoir storage is commonly divided into the inactive zone, the water supply (conservation) zone, and the flood control zone. The distribution of water among the flood control and water supply zones varies seasonally. The schedules for WCA-1, WCA-2A, and WCA-3A include a minimum water level below which water releases are not permitted unless water is supplied from another source. When water levels fall below the minimum levels, transfers from Lake Okeechobee or the WCAs are made to meet water supply demands.

3.3.3 Flooding

Many of the developed areas in southeastern Florida that were formerly part of the Everglades depend on the C&SF system for flood protection. The regional canal systems provide flood protection to developed areas in eastern Dade, Broward, and Palm Beach counties. Local stormwater management systems collect and route stormwater to the regional canals, then discharge to the ocean via estuaries. SFWMD with other local government and agencies encourage integration among land use, watershed management, and stormwater master plans. Under flood conditions, stormwater managers focus on rapid and efficient removal of floodwaters regardless of impacts on water supply and natural systems.

The WCAs provide a detention reservoir for excess water from the agricultural area and parts of the Lower East Coast region and for flood discharge from Lake Okeechobee. Prior to the construction of the C&SF project features, flow in the Everglades was uncontrolled, and stages varied greatly and at times overtopped Tamiami Trail.

3.4 WATER QUALITY

3.4.1 Surface Water

General. The water quality in the Everglades has been greatly influenced by development-related activities. Extensive drainage networks allowed the development of large land tracts for urban and agricultural development. Nonpoint (e.g., agricultural runoff) and point (e.g., wastewater discharges) sources of contamination now influence surface waters in many areas. Among the primary concerns in the Everglades are nutrients, dissolved oxygen (DO), mercury, biochemical oxygen demand (BOD), and coliforms. The 2005 RGRR/SEIS discussed water quality concerns in the project area.

Highway Runoff. Highway use results in the introduction of metals, fuels, lubricants, combustion products, and toxic chemicals as potential environmental contaminants. Table 1 summarizes several of the major constituents in runoff from highway use and their primary sources. The concentration of pollutants in runoff is dependent on a number of factors, including the amount of traffic to which the road is subjected.

Table 1. Highway Runoff Constituents and Their Primary Sources

Constituents	Primary Sources
Lead	Leaded gasoline (exhaust), tire wear, lubrication, bearing wear
Zinc	Tire wear, motor oil
Iron	Rust, vehicle/engine wear
Copper	Metal plating, bearing/bushing wear, engine wear, brake wear
Cadmium	Tire wear, metal plating
Chromium	Metal plating, engine wear, brake wear
Nickel	Exhaust, lubricants, plating, brake wear
Organic compounds	Vehicle exhaust, fuel leaks, lubricants

Source: USEPA (1993).

Potential local sources of pollutants in addition to highway runoff include airboat franchises and residential areas along the Tamiami Trail. Transport of metals from other locations by the network of canals may also occur.

ENP, located south of the Project Area, is an OFW requiring special consideration. In general, an OFW has narrative criteria for not allowing degradation/worsening of water quality conditions relative to the better of (1) to a fixed point in time, which for ENP is 1978-79, or (2) the conditions that existed in the year prior to application to FDEP for a Water Quality Certification (WQC). To reduce any potential for degradation of water quality in ENP, the State of Florida requires that the treatment of storm runoff be included as a component of the highway and bridge construction projects.

3.4.2 Groundwater

South Florida contains three major aquifer systems. The surficial aquifer system is comprised of rocks and sediments from the land surface to the top of the confining bedrock. The locally productive water bearing units of the surficial aquifer include the Biscayne Aquifer, the undifferentiated surficial

aquifer, the coastal aquifer of Palm Beach and Martin counties, and the shallow aquifer of southwest Florida. Practically all municipal and irrigation water is obtained from the surficial aquifer system. The Biscayne aquifer has been classified as a Sole Source Aquifer under the Federal Safe Drinking Water Act based on the aquifer's susceptibility to contamination and the fact that it is a principal source of drinking water. Well fields in this aquifer can generally yield in excess of 2,000 gallons per minute. Because the Biscayne Aquifer is highly permeable and is at or near the land surface in many locations, it is readily susceptible to groundwater contamination. Well fields in the aquifer can be recharged rapidly and effectively from WCAs and the coastal canal system.

The intermediate aquifer system consists of beds of sand, sandy limestone, limestone, and dolostone that dip and thicken to the south and southwest. In much of South Florida, the intermediate aquifer represents a confining unit that separates the surficial aquifer system from the Floridian aquifer system.

The Floridian aquifer system is divided by a middle confining unit into the Upper and Lower Floridian aquifers. From Jupiter to south Miami, the Upper Floridian Aquifer is being considered for storage of potable water in an aquifer storage and recovery program. In the Lower Floridian Aquifer, there are zones of cavernous limestones and dolostones that contain saline water and are used primarily for injection of treated sewage and industrial wastes. Where the aquifer contains fresh water, it is a water supply source.

3.5 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW)

A Phase I Hazardous Toxic and Radioactive Waste Assessment (HTRW) site assessment of the project area was conducted in late 2006. The assessment included the property within a strip extending the length of the project corridor and from the L-29 Canal to 200 feet south of the centerline of the Tamiami Trail. The area assessed included properties owned by Lincoln Financial Media, Everglades Safari, the Airboat Association of Florida, Gator Park, Coopertown (two adjacent tracts), Radio One Communications, and Florida Power and Light;

The site assessment identified four sites with “recognized environmental conditions” (defined by USEPA as the presence or likely presence of any regulated substance under conditions that indicate a release, threatened release or suspected release of any regulated substance or pesticide at, on, to or from a remediation site into structures, surface water, sediments, groundwater, soil, fill or geologic materials). Results of the site assessment by property are:

- **Lincoln Financial Media** - No evidence of recognized environmental conditions;
- **Airboat Association** - No evidence of recognized environmental conditions;
- **Radio One** - no evidence of recognized environmental conditions;
- **Florida Power and Light**- no evidence of recognized environmental conditions;
- **Coopertown** - Drums of new and used motor oil without secondary containment and the occurrence of arsenic in soil samples collected near the septic system and maintenance shed constitute recognized environmental conditions;
- **Everglades Safari** - A petroleum discharge from a former UST, a waste oil drum lacking secondary containment, and heavy petroleum staining on the fissured asphalt pavement along the eastern end of the parking lot constitute recognized environmental conditions;
- **Gator Park** - The occurrence of elevated concentrations of organic vapors in soil samples collected near a former tank pit constitutes a recognized environmental condition at Gator Park;
- **Roadside ditches at entrance to Radio One** - The presence of cis- and trans- 1,2-dichloroethene, trichloroethene, vinyl chloride, and 4-isopropyltoluene constitutes a recognized environmental condition.

Based on the results of the Phase I ESA, the USACE is considering:

- Monitoring the progress of an on-going state funded clean-up at Everglades Safari to ensure the eventual approval of a request for No Further Action and a Site Rehabilitation and Completion Order from the FDEP;
- An assessment of potential petroleum contamination of the soil beneath certain portions of the asphalt pavement at Everglades Safari;
- Requesting Coopertown to provide secondary containment for the drums of new and used motor oil;
- Completion of an assessment of arsenic in the soil at Coopertown;
- Completion of an assessment of the organic vapors detected at Gator Park and
- An assessment of the extent of contaminants in the surface water adjacent to the Radio One access road.

3.6 ENVIRONMENTAL RESOURCES

The historic Everglades was a broad, shallow wetland with water flowing very slowly over 3,900 square miles from Lake Okeechobee to the mangrove zone at the southern tip of Florida. The sheetflow that naturally occurred over this region was influenced by rainfall and a relatively low surface relief. Sheetflow provided the necessary conditions for the development of the

Everglades ecosystem. Figure 20 illustrates locations of important natural features of the project area.

3.6.1 Everglades National Park (ENP)

ENP was authorized by Congress on May 10, 1934 and dedicated by Harry S. Truman on December 6, 1947. The enabling legislation provided the fundamental purpose of the park as being:

> *. . . permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken that will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in this area.*

The original 460,000 acres in 1947 was expanded to 1.3 million acres by 1978 under the terms of the Wilderness Act of 1964. Wilderness designation is not a "closure" of parklands; it just affects how they may be accessed by the public. For example, motorized watercraft is allowed on marine waters within wilderness. Airboats are only allowed in designated areas. Further, no motorized vehicles or mechanized equipment are allowed on wilderness lands.

Recognizing ENP as a nationally and internationally significant resource, Congress in 1989 passed the "Everglades National Park Protection and Expansion Act"(PL 101-229). This law authorized the acquisition of additional land to benefit the natural resources of ENP. Section 101(b) states that the purpose of the Act is to:

> *. . .increase the level of protection of the outstanding natural values of Everglades National Park and to enhance and restore the ecological values, natural hydrologic conditions, and public enjoyment of such area. . .*

By NPS policy, lands included in the East Everglades Expansion are being assessed to determine whether they are suitable for possible wilderness designation.

Because the ENP possesses "outstanding natural values," it was designated by the United Nations Educational, Scientific, and Cultural Organization as an International Biosphere Reserve in 1976 and subsequently as a World Heritage Site in 1979. The site includes historic Everglades that have been

limited in manmade influences and, for the most part, avoids agricultural land. In 1987, the Ramsar Convention designated ENP as a Wetland of International Importance.

3.6.2 Shark River Slough East and West Basins

Historically, Shark River Slough was a 30-mile-wide expanse of relatively shallow water moving downstream through the low-gradient wetland landscape. The pattern of water flow was regionally uniform across a broad expanse and lacked any central drainage channel or dendritic drainage pattern. The slough collected flows from the eastern portion of the Everglades, including the western side of the Atlantic coastal ridge, and moved that water to the southwest through the mangrove estuaries of the southwestern coast into the Gulf of Mexico.

Marl prairies, fire-maintained marshes that are intermittently flooded, flank both sides of Shark River Slough. A unique feature of the marl prairies is the high species richness of the plant communities. Sawgrass (*Cladium jamaicense)* and muhly grass (*Muhlenbergia capillaris* var. *filipes*) dominate, although more than 100 species of mostly herbaceous plants have been reported. Higher elevation tropical hammock and pine forests occur as islands within the prairie landscape. These tree islands support plants of West Indian origin that are unique to South Florida and contain the highest number of rare plant species in South Florida.

Historically, the ridge and slough landscape was an extensive landscape, encompassing WCA-3B and Shark River Slough. Within this ridge and slough landscape is a complex mosaic of marsh assemblages with distinct tree islands. The marsh contains large stands of sawgrass that are interrupted by more open communities with a mixture of smaller aquatic plants and periphyton. These habitats are frequently elongated and oriented parallel to the direction of water flow, suggesting a strong functional connection between hydrology and vegetation. Tree islands of various types form a third element of the ridge and slough landscape, rising slightly above the elevation of the sawgrass ridges. The orientation of the larger tree islands has the same parallel alignment to the direction of flow.

Although seemingly small, the two-to-three-foot difference in elevation between ridge surface and slough bottom was highly significant in the pre-drainage Everglades. During the typical annual rise and fall of wet- and dry-season water levels, this elevation difference allowed sloughs to remain water-filled throughout the year, while adjacent ridges would be exposed only a few months of the year. In the pre-drainage system, native species were adapted to the multiple habitats provided by the tree islands, ridges, and

sloughs. Aquatic organisms depended on the sloughs as extensive areas that would remain inundated throughout all but exceptionally dry years.

3.6.3 Water Conservation Area 3B

WCA-3B, located to the north of the L-29 Levee for the entire length of the project, is managed by the Florida Fish and Wildlife Conservation Commission (FWC) as the Francis S. Taylor Wildlife Management Area.

Between 1960 and 1963, the completion of levees and structures created the impoundment of the Water Conservation Areas. Although created primarily to reduce seepage, the ecological effects of WCA-3B have been detrimental and far-reaching. Bedrock topography, depths of organic soil, and vegetation all indicate that the centerline of SRS ran northeast to southwest south of Tamiami Trail, between the L-67 Extension and L-31. Tree islands visible on satellite imagery clearly indicate that the pre-drainage flow-lines into Shark River Slough originally ran directly through WCA-3B. Thus, the L-29 levee at the bottom of WCA-3B eliminated natural overland flow into Shark River Slough and the ridge and slough landscape (USACE & SFWMD, 2002).

WCA-3B is now dominated by a wetland sawgrass community that has resulted from the management of water levels and flow quantities. The area provides nesting and foraging habitat for many terrestrial and aquatic species. Tree islands found throughout the area are used by a wide variety of wildlife.

3.6.4 Biological Resources

WCA-3B and ENP are mostly natural areas with long and short hydroperiod wetlands with an abundance of interspersed willowheads, bayheads, and hardwood hammocks. Sawgrass (*Cladium jamaicense*) communities dominate the long hydroperiod wetlands, whereas muhly grass (*Muhlenbergia capillaris*) and black sedge (*Schoenus nigricans*) dominate the short hydroperiod wetlands mostly influenced by Northeast Shark River Slough and local rainfall. Four herbaceous wetland cover types are found in the Everglades: (1) sloughs with deep, permanent water levels; (2) sawgrass marshes with semi-permanent water levels and long hydroperiods; (3) wet peat prairies; and (4) wet marl prairies with shorter hydroperiods.

Plant communities present along the Tamiami Trail in the project area include:

- Swamp forest bayheads (*Magnolia virginiana, Annona glabra, Chrysobalanus icaco, Persea borbonia, Ilex cassine, Metopium toxiferum*, among others);
- Maidencane/spike-rush, a mix of shallow open water, *Eleocharis* spp. *and Panicum hemitomon*, which can include sparse association of low-stature *Cladium jamaicense, Typha* spp., *Sagittaria lancifolia, Pontederia lanceolata, Nymphaea*. spp., etc., typical of SFWMD impounded conservation areas;
- Graminoid (grasses, sedges, and rushes);
- Non-graminoid emergent marsh (*Pontederia lanceolata, Sagittaria* spp., *Nymphaea odorata, Typha* spp., with *Ludwigia repens* and *Utricularia* spp. as possible submergents);
- Saw grass (*Cladium jamaicense*);
- Cattail (*Typha* spp.);
- Scrub hardwood, which includes species such as *M. toxiferum, P. borbonia, Myrica cerifera, I. cassine, M. virginiana, Myrsine floridana, Conocarpus erectus, Chrysobalanus icaco*, often with a moderate-to-heavy component of mixed grasses; and
- Willow shrublands *(Salix caroliniana*).

Other classifications along the Tamiami Trail include Brazilian pepper/ shrubland mix, open water, spoil areas, areas influenced by human activities, major roads, and canals.

Partitioning of the Everglades by levees, canals, and roads has created barriers to the free movement of organisms, particularly aquatic species and those with limited mobility. The Tamiami Trail, the L-29 Canal, and the L-29 Levee are impediments to the free movement of organisms between ENP and WCA-3B. For aquatic organisms, the L-29 Levee and its associated water control structures obstruct movement between the L-29 Canal and WCA-3B. Aquatic connectivity between the L-29 Canal and ENP is currently limited to the series of small culverts under the Tamiami Trail. The L-29 Canal is a potential obstruction that must be crossed by terrestrial animals by swimming, and traffic mortality on the Tamiami Trail reduces the free movement of animals.

3.6.5 Protected Species

Federally listed species known or potentially encountered in the project area, and which were given consideration by FWS coordination in accordance with Section 7 of the Endangered Species Act, include the Cape Sable seaside sparrow, eastern indigo snake, Florida panther, snail kite, West Indian manatee, and wood stork.

- Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*). The Cape Sable seaside sparrow was listed as endangered in 1967. The principal reasons for its decline and the greatest threats to its continued survival are vegetation changes, fire, development, and hydrologic alteration. Nesting may begin as early as late February and may persist into early August. The amount of summer nesting, which essentially means the number of third broods attempted, may depend on the characteristics of individual rainy seasons. Nesting activity decreases abruptly when the marsh becomes flooded. The Cape Sable seaside sparrow remains widely distributed over a large area of South Florida and continues to occupy much of its historically known range in Collier, Dade, and Monroe counties. It inhabits brushless, subtropical marshes (prairies) of interior southern Florida.

- Eastern Indigo Snake (*Drymarchon corais couperi)*. The indigo snake was listed as threatened in 1979 because of a loss of habitat associated with farming, construction, forestry, and other land use conversions, as well as over-collecting for the pet trade. In South Florida, the snake can be found in a variety of habitats, including wet prairies and mangrove swamps. Farther north, it can be found in pine-hardwood forest, mixed hardwood forest, creek bottoms, agricultural fields, and sandy habitats of the Florida scrub communities, typically in association with gopher tortoises.

- Florida Panther (*Puma [= Felis] concolor coryi*). The Florida panther was listed as endangered in 1967. Activities beginning as early as the 1800s influenced the status of the panther, with the first bounty passed in Florida in 1832. Following bounty hunting, agricultural land clearing and lumbering reduced its habitat drastically into the 1950s. Significant habitat reduction continues today. Other factors affecting the population's decline include contaminants, prey availability, human-related disturbance and mortality, disease, and genetic erosion. The only known reproducing panther population is located in the Big Cypress Swamp/Everglades physiographic region of South Florida. Panthers prefer native, upland forests, especially hardwood hammocks and pine flatwoods, to wetlands and disturbed habitats.

- Snail Kite (*Rostrhamus sociabilis plumbeus*). Snail kites, listed as endangered in 1967, require long hydroperiod wetlands that

remain inundated throughout the year. This preference is associated with the apple snail (*Pomacea paludosa*), its primary food source, which requires nearly continuous flooding of wetlands for greater than one year. Suitable habitats for the kite include freshwater marsh and shallow vegetated lake margins where apple snails can be found. Critical habitat for the snail kite was designated in 1977 and includes WCA-1, 2, and 3A, and portions of ENP, as well as Lake Okeechobee shorelines and portions of the St. Johns marsh. Preferred nesting habitat includes small trees and shrubs such as willow, bald cypress, pond cypress, sweet bay, dahoon holly, southern bayberry, and elderberry. During dry periods when suitable shrubs and trees experience dry conditions, herbaceous species such as sawgrass, cattail, bulrush, and common reed are used for nest sites. The breeding season can vary from year to year depending on rainfall and water levels. Ninety-eight percent of nesting attempts occur from December through July, with 89 percent initiated between January and June. Figure 20 depicts recent snail kite nesting locations and protection zones.

- **West Indian Manatee (*Trichechus manatus*).** The West Indian manatee was first listed as endangered in 1967. This species lives in freshwater, brackish, and marine habitats and eats submerged, emergent, and floating vegetation. During the hot summer months, the mammal's habitat can range as far north as Rhode Island and as far west as Texas. During winter months, the population concentrates in peninsular Florida, depending on warm water flows from natural springs and power plant outfalls. The most significant threat facing manatees in Florida is death or injury from boat strikes.

- **Wood Stork (*Mycteria americana*).** The wood stork was listed as endangered in 1984 due to loss of foraging habitat and colony nesting failures. Preferring freshwater wetlands for nesting, roosting, and foraging, wood storks can be found throughout central and southern Florida. Nests are typically constructed in tree stands within swamps or stands surrounded by large areas of open water. Because of their tactile feeding methods, storks feed most effectively in shallow water settings where prey items are concentrated. During winter and spring dry seasons when water levels recede, prey items are often further concentrated, providing foraging areas with abundant food supplies. Drainage in South Florida may be responsible for delaying stork nesting from November to as late as February or March. Nesting delays

are believed to contribute to nest failures and colony abandonment because of the dispersal of prey items associated with the onset of the wet season (May-June). Wood stork rookeries occur at two pond apple stands along the south side of the highway: the Tamiami Trail West Rookery and the Tamiami Trail East Rookery (see Figure 20).

The FWS, using the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Guidelines) (Ogden 1990) based on photography from the 1999 nesting season, identified primary and secondary restriction zones for the Tamiami West Colony. The Primary Zone is the most critical area and must be managed according to the Guidelines to insure the colony survives. For the Tamiami East and West rookeries, the primary zone extends only 1,000 ft on all sides. The pond apple forest creates a visual barrier between the rookery and Tamiami Trail. The storks appear to have become somewhat acclimated to highway traffic noise.

The Secondary Zone extends 1,000 ft beyond the primary zone. Restrictions are needed to minimize disturbances to the Primary Zone. The Secondary Zone may be used by wood storks for collecting nesting material and for roosting, loafing, and feeding (especially important for newly fledged young).

Approximately 2,295 linear ft of the existing Tamiami Trail are located within the Primary Zone for the Tamiami West Colony, and 2,122 linear ft are located within the Secondary Zone for the western rookery. The only restricted area for the Tamiami East Colony is 3,123 linear ft in the Secondary Zone.

In addition to the wood stork, FWC has identified six birds as species of special concern that may nest or otherwise be found in the vicinity of Tamiami Trail between S-334 and the L-67 Canal: tricolored heron, snowy egret, little blue heron, limpkin, roseate spoonbill, and white ibis. These migratory birds are protected under the provisions of the Migratory Bird Treaty Act. They are protected species under the jurisdiction of FWS. Nesting activities in these rookeries usually last until the rains have dispersed prey, leading to the cessation of nesting. FWS and FWC identified the Frog City wading bird colony, which hosts tricolored herons and great egrets, as potentially requiring protective measures during construction. The Frog City rookery is located in WCA-3B close to the L-29 Levee approximately one-quarter mile west of the Tigertail Camp.

The American alligator (*Alligator mississippiensis),* a species of special concern, and the Everglades mink (*Mustela vison evergladensis*), listed as threatened by the State of Florida, are also found along the Tamiami Trail corridor.

3.7 CLIMATE

The subtropical climate of South Florida, with distinct wet and dry seasons, high rates of evapotranspiration, and climatic extremes of floods, droughts, and hurricanes, sustains the Everglades while creating water supply and flood control issues in the agricultural and urban areas. Temperatures are moderated by the Atlantic Ocean and Gulf Stream, but the moderating effects quickly diminish inland. The average temperature is 68° Fahrenheit (F) in winter and 82° F in summer. Seasonal rainfall patterns in South Florida resemble the wet and dry season patterns of the humid tropics more than the winter and summer patterns of temperate latitudes. Of the 53 inches of rain that South Florida receives annually on average, 75 percent falls during the wet season months of May through October. During the wet season, thunderstorms generated by easterly tradewinds and land-sea convection patterns occur almost daily. The prevailing wind is from the east-southeast. Wet season rainfall peaks during May-June and September-October. Tropical storms and hurricanes also provide major contributions to wet season rainfall with a high level of annual variability and low level of predictability. During the dry season, rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. High evapotranspiration rates in South Florida roughly equal annual precipitation. Recorded annual rainfall in South Florida has varied from 37 to 106 inches, and annual extremes in rainfall result in floods and droughts. Multi-year high and low rainfall periods often alternate on a time scale approximately on the order of decades.

3.8 AIR QUALITY

In accordance with the 1990 Clean Air Act Amendments (CAA), the USEPA designated the Southeast Florida Airshed, consisting of Miami-Dade, Broward, and Palm Beach counties, as a nonattainment area for ozone and its precursors. On April 27, 1995, the airshed was redesignated as an ozone attainment/maintenance area. Miami-Dade County is an attainment area for carbon monoxide. Nitrogen dioxide, sulfur dioxide, and total suspended particulates are present in concentrations that are better than national standards. USEPA has not determined a designation for airborne lead in southeastern Florida. ENP is a Class I Airshed.

3.9 RECREATION

ENP receives in excess of a million visitors each year. Recreational opportunities include biking, boating, fishing, hiking, camping, and wildlife viewing. Approximately six miles west of the project area, the Shark Valley Information Center offers a 15-mile round-trip tram road (not open to private motorized vehicles) that extends into the marsh, offering one of the best opportunities for viewing wildlife. A two-hour narrated tram ride provides an overview of the freshwater Everglades, and bicycles are available to rent. An observation tower is located at the half-way point.

The Airboat Association of Florida is a recreational association with facilities on the south side of the Tamiami Trail about three miles east of the western end of the project area. Facilities include a caretaker's residence, meeting room, workshop arenas for working on airboats, a cookhouse, several mobile RV sites including covered picnic areas, and a pistol shooting range.

Three commercial airboat tour operators are also located on the south side of Tamiami Trail and receive between two and three hundred thousand visitors a year. These ecotourism businesses offer guided tours into ENP.

The Francis S. Taylor Wildlife Management Area, which includes WCA-3B, is managed by FWC. This area is managed for both consumptive (hunting, frogging, fishing) and non-consumptive (wildlife viewing, camping, boating, airboating, etc.) recreational use and environmental purposes. WCA-3B is accessed by crossing the L-29 Canal at either the S-333 or S-334 water control structures and launching at the boat and airboat ramps.

The verge between the L-29 Canal and the L-29 Levee is used for passage along the canal, picnicking, or launching boats into the L-29 Canal. A road atop the L-29 Levee allows panoramic views to the north into WCA-3B.

Primary access to boat ramps on the north side of the L-29 Canal is at S-333 and S-334. Roads across these structures lead to several boat ramps and to bank fishing on the north bank of the L-29 Canal. S-334 provides access to a boat ramp (Boat Ramp 153) three miles to the east that allows boat launching into the L-29 Canal. A picnic area is associated with the boat ramp. Control structure S-333 provides access across the L-29 Canal to one airboat ramp and two boat ramps. There is a boat ramp on Canal 67-A and another on Canal 67-C. Both ramps are heavily used by boat fishermen. The airboat ramps provide access for deer and waterfowl hunters, as well as for recreational airboaters. Approximately 10.5 miles of the north bank of the L-29 Canal are available for bank fishing.

Bank fishing is also popular from the shoulders of the Tamiami Trail. Fishermen frequent the 10.7 miles of the south bank of the L-29 Canal (north shoulder of the highway). The only places for bank fishing on the south side of the highway are where the culverts discharge water to the south. FWC personnel conducted angler counts along the Tamiami Trail from December 1998 to May 1999. The mean number of anglers per mile for weekdays and weekend days, respectively, was 0.95 and 2.28. Ninety-four percent were bank anglers (personal communication, FWC, September 28, 2000). These numbers translate into an estimated 10 fishermen per weekday and 23 per weekend day, totaling approximately 5,000 man-days of fishing per year within the 10.7-mile study area. Personal observation revealed 25 bank fishermen and two boats with two fishermen in the project study segment at approximately 10:00 a.m. on a Saturday in September 2000. Almost all the bank fishermen were fishing on either side of the highway right-of-way, with only a few on the north bank of the L-29 Canal.

It should be noted that at least some of the fishing is subsistence, not recreational. There is reportedly recreational fishing for oscars, which apparently "put up a good fight." Recreational anglers have been observed fishing for bass by boat in the canal during the short period of time when dry conditions drive the bass out of the marshes (Dr. Joel Trexler/Florida International University, pers. comm.).

3.10 CULTURAL RESOURCES

Studies for historic and archaeological resources were conducted to identify and assess National Register of Historic Places (NHRP) eligibility of historic properties within the project area, to survey potential archaeological sites, to conduct archival research, and to assess the potential of each historic resource as a Traditional Cultural Property as defined by National Register Bulletin No. 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*. This work was conducted to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the Archaeological and Historic Preservation Act of 1974.

Cultural resource surveys have been performed by Janus Research (2001) and New South Associates (2006). Background research was conducted at the Florida Master Site File in the Florida Collection of the Florida State Library. Additional literature was examined at the University of Florida libraries, the Miami-Dade Public Library, and the Historical Museum of Southern Florida.

Ethnographic interviews determined that several cultural groups use the L-29 Canal for recreation and food. Formal and informal interviews were

conducted with anglers, business owners, and members of the Airboat Association of Florida. Because these activities are not limited to the canal or form the basis for identity of any group, the L-29 Canal was not recommended as a Traditional Cultural Property (New South Associates, 2006).

Archaeological surveys consisted of visual examinations, limited shovel testing along the right-of-way of the Tamiami Trail, and six areas having the greatest potential for containing archaeological deposit: the Osceola Camp, Everglades Safari Park, the Airboat Association of Florida, Gator Park, and Coopertown Restaurant and Airboat Rides. None of the locations contained cultural material (New South Associates, 2006).

Architectural historians assessed properties within the project area for NRHP eligibility. Four historic properties within the project corridor were recommended and evaluated for potential eligibility for the NRHP by Janus Research and New South Associates.

Tamiami Trail, Site Number 8DA6765. SHPO concurred with the eligibility recommendation by Janus Research. The highway is considered a historic engineering and construction feat under conditions that were unprecedented in highway construction. It provided the first route across the southern peninsula and offered an opportunity for the general public to observe the Everglades from automobiles.

Tamiami Canal, Site Number 8DA6766. SHPO concurred with the Janus Research eligibility recommendation. The canal is tied to the historic and engineering significance of the highway, and neither would exist without the other.

Coopertown Airboat Rides and Restaurant, Site Number 8DA6767. SHPO concurred with the eligibility recommendation by Janus Research. Coopertown has historic significance as a former Seminole camp and as a work camp during construction of the Tamiami Trail. It is the oldest continuously operating airboat tour business and is representative of the heritage of tourism in Florida.

Gator Park, Site Number 8DA10088. Both Janus Research and New South Associates considered this site not to be eligible for NRHP. The facility consists of a ca. 1950 concrete block building, an outbuilding, a campground, a wildlife show area, and an airboat docking facility. The building appears to have been originally a gas station, and it has been altered from its original appearance. Gator Park is considered not eligible for NRHP listing because the building has been altered, and the facility does not have a long history as

a tourist attraction. The facility was originally built as a gas station and has been modified as a tourist attraction (New South Associates, 2006).

The State Historic Preservation Officer (SHPO) by letter of September 21, 2001, concurred with the recommendations that the Tamiami Trail, the Tamiami Canal, and Coopertown were eligible for NHRP.

Airboat Association of Florida, Site Number 8DA6768. Subsequent to the 2001 findings and recommendations, members of the public expressed the opinion that the Airboat Association of Florida site has historic value. The Airboat Association of Florida has been using the site for recreational airboating since 1952 and is the principal proponent for the sport in this section of the Everglades. Although Janus Research was denied access to the site, access was subsequently granted to New South Associates, who, based on archival and oral historical research, recommended that the Airboat Association of Florida site was potentially eligible for the NHRP.

Two additional investigations of cultural resources commissioned by ENP revealed no additional resources within the footprint of the project (Schwadron, 2006a,b).

3.11 AESTHETICS

The views along the project segment of the Tamiami Trail are interesting, but somewhat limited and constrained. On the north side of the highway are the L-29 Canal and the L-29 Levee, which extend along the entire 10.7 miles of the project segment. The view of the north side of the canal and levee is broken up by several water control structures and the Tigertail Camp. A panoramic view of the sawgrass and occasional hammocks or tree islands is largely blocked by the height of the levee. On the south side, the view is often blocked by tall vegetation along the roadside. Occasional breaks allow some distance views. The Osceola Camp and the grove of trees at the Airboat Association site provide some points of interest.

3.12 NOISE ENVIRONMENT

The 2003 GRR/SEIS evaluated existing conditions, future without project conditions, and the alternatives under consideration at that time. Table 2 presents project area traffic data from the report.

Traffic noise impacts were evaluated using maximum peak hour traffic at LOS "D" because they provide higher noise levels than maximum peak hour traffic at LOS "C." Because the geometry of all current alternatives is identical with respect to Highway Capacity Manual (HCM) operational

analysis, projected flow, LOS, and average speeds are identical for a given year and month for all alternatives.

Table 2. Project Area Traffic Data

Year	ADT (vpd)	Design Hour (vph)	Flow (vph)	Level of Service (LOS)	Average Speed (mph)
2000	5,375	800	860	D	50
2020	8,852	1,316	1,400	D	50

Source: USACE (2003).

Sensitive receivers selected and evaluated for the 2003 report included the Flight 592 Memorial, Osceola Camp, Safari Park, Gator Park, Tigertail Camp, Coopertown Airboats, and the Airboat Association of Florida. Three sound levels were determined for each activity: (1) noise abatement criteria (NAC); (2) existing noise levels; and (3) predicted noise levels.

Ambient noise levels were recorded for 16.5 hours at the Osceola Camp and at the Tigertail Camp to determine background and peak hour noise levels. Measurements indicated average background A-weighted hourly equivalents (LAeq1h) of 65.8 dBA at the Osceola Camp and 58.4 dBA at the Tigertail Camp. Peak hour levels were 68.0 dBA at the Osceola Camp and 61.0 dBA at the Tigertail Camp.

Peak hour existing conditions from the 2003 report are presented in Table 3. Significantly, the evaluation indicated that the northwest portion of the Osceola Camp exceeded FDOT approach criterion of 66 dBA at peak hour existing conditions.

3.13 EXISTING ROADWAY

The original Tamiami Trail was most likely constructed in the late 1920s and early 1930s primarily by digging the canal by steam shovel and placing the spoil ahead to create the roadbed. In the mid-1940s, about 38 bridges were added at various locations on the Tamiami Trail, 19 of which were within the project area. In the early 1950s, the bridges were removed and replaced with the culverts that are currently in place (Figure 4). In 1968, the shoulders were widened and the pavement was overlaid. In 1970, a guardrail was added on the north side. At some time in the 1980s or 1990s, another guardrail was added on the south side of the road. Finally, in 1993, the shoulders were widened, and the mainline pavement was resurfaced.

Table 3. Existing Peak Hour Noise Levels

Site	Receiver[1]				
	1	2	3	4	5
Flight 592 Memorial	59.9	--	--	--	--
Osceola Camp	68.3	62.0	57.5	62.2	62.6
Safari Park	69.6	69.9	--	--	--
Gator Park	69.6	62.7	--	--	--
Tigertail Camp	60.5	60.8	--	--	--
Coopertown Airboats	69.6	69.9	62.7	--	--

Notes: [1] Hypothetical points for sites for existing peak-hour modeling.

Source: USACE (2003).

FDOT requires that culverts be designed for a projected maintenance-free time or a Design Service Life (DSL) appropriate for the culvert function and highway type. Recently, the FDOT Culvert Service Life Estimator Program was used with soil parameters to determine DSLs for four locations. The results indicated that the existing reinforced concrete pipe culverts under US 41, which have been in operation for approximately 50 years, should continue to provide service for an additional 50 years.

The road is currently in need of maintenance. The asphalt surface of the road has surface environmental stress cracks and subsurface fatigue cracks. On the Pavement Condition Rating, by which road surfaces are rated on a scale of 1 to 10, the Tamiami Trail would receive an FDOT rating of 6. When a road is rated at 6 or below, repair actions are typically required. Because of pavement deterioration in terms of cracking, rutting, and ride, FDOT determined that the portion of the Tamiami Trail within the project area is in need of rehabilitation.

3.14 TRIBAL LANDS

The Miccosukee Tribe of Indians has lived in what is now ENP for generations and has traditional, aboriginal, and statutory rights to live in the Everglades.

Two Miccosukee Tribe family group settlements are located within the project area: the Tigertail Camp and the Osceola Camp. The Tigertail Camp, located north of Tamiami Trail between the L-29 Canal and the L-29 Levee, is home

to approximately 15-20 people, as indicated by the 2003 report. Vehicle access is by means of unimproved roads adjacent to and on top of the L-29 Levee that intersect the Tamiami Trail at canal crossings at each end of the project area. A pedestrian bridge crossing the canal connects a small parking area along the northern side of the highway to the Tigertail Camp. The living facilities of the Tigertail Camp were recently elevated above the flow levels anticipated for MWD.

According to the RGRR/SEIS, the Osceola Camp is home to 10-15 people. It is located on the south side of the Tamiami Trail approximately one-half mile east of the western end of the project area. Access is by vehicle directly from the highway.

3.15 ECONOMICS/SOCIOECONOMICS

The project study area is west of the "limits to urbanization" boundary established by the Miami-Dade Planning Department. Coupled with the protected natural areas north and south of the corridor, this effectively means that no additional development will be allowed along the corridor within the project limits. However, new ENP operations/visitor areas are possible in light of the ongoing ENP General Management Planning process consistent with the Everglades National Park Protection and Expansion Act of 1989.

The Miami-Dade County region is a major metropolitan area with a population in excess of two million. The region supports a diverse economy with an emphasis on tourism, wholesale and retail trade, manufacturing, and shipping/transport. Miami-Dade County, which encompasses more than 2,000 square miles, is located along the southeastern portion of the Florida peninsula. It is bounded by Biscayne Bay and the Atlantic Ocean to the east, ENP to the west, the Florida Keys to the south, and Broward County to the north. One-third of the Miami-Dade County area is within the boundary of ENP.

According to the 2000 census, the population of the county is approximately 70 percent white and slightly more than 20 percent black. Approximately 57 percent of Miami-Dade residents identify themselves as Hispanic. In 2000 it was estimated that 18 percent of the county's residents were in poverty, with almost 25 percent of that number being children under the age of 18. Over one million people were employed. Local, state, and Federal government employment accounted for approximately 143,000 jobholders.

Three tourist-oriented businesses located on the south side of Tamiami Trail in the study area offer airboat trips, souvenirs, and restaurant facilities:

Coopertown Airboat Rides and Restaurant, Everglades Safari Park, and Gator Park, Inc. The particular attraction of the businesses is ecotourism. Their guided airboat tours into ENP include explanations about the nature of the Everglades as an ecological area and information on some of the plants and animals. According to the owners/managers of the businesses, approximately 90 percent of all visitors inquire about airboat tours (Personal communication, business owners/managers, multiple dates, 2000).

The three businesses have approximately 15 permanent residents among them. One also has recreational vehicle sites, many of which are occupied for extended periods by "semi-permanent" residents. The businesses also employ approximately 30 full time and 20 part time workers.

3.16 FLIGHT 592 MEMORIAL

The Valu Jet Flight 592 Memorial is located at the western end of the project area on the northern side of the L-29 Levee, about 250 ft from Tamiami Trail. Access to the memorial is via the S-333 canal crossing. The site consists of a parking area and a sculpture/memorial consisting of 110 concrete pillars that symbolize each of the lives lost in the DC-9 crash on May 11, 1996. The pillars are arranged in a triangular pattern that points to the actual crash site eight miles away in the Everglades.

Section 4.0
ENVIRONMENTAL EFFECTS OF ALTERNATIVES

4.1 INTRODUCTION

As described in Section 2.0 Alternatives, the No-Action alternative is the Recommended Plan from the 2005 RGRR/SEIS. Both the No-Action Alternative and the TSP include environmental impacts through construction of the improved road and flooding associated with MWD water flows.

The No-Action alternative and the TSP differ in the agency providing acquisition of real estate interests for impacted properties and the timing of those acquisitions. Although it was anticipated in the 2005 RGRR/SEIS that ENP would be able to complete the real estate acquisitions prior to construction, it would be necessary for ENP to complete the General Management Plan and EIS before the acquisition of real estate interests could be started. To meet a construction schedule that requires obtaining real estate interests beginning in 2007, the TSP would involve the USACE acquiring real estate interests.

4.2 GEOLOGY AND SOILS

Although construction of the project involves the movement of soils, driving of piles, and making shallow excavations into the limestone bedrock, There would be no effect on geological conditions or soils along the Tamiami Trail from either the No-Action alternative or the TSP.

4.3 WATER MANAGEMENT

No-Action Alternative. One of the objectives of a bridge opening is to minimize the head differential between the L-29 Canal and the downstream marsh. Under the MWD project, water would be delivered to the L-29 Canal from WCA-3A, WCA-3B, and the L-31N Canal through seven separate structures. The L-29 Canal would receive this water and act as a stage equalizer upstream of the highway embankment. The stage in the L-29 Canal under the MWD project would be dictated by water flowing through the bridge openings.

The project would provide three miles of hydraulic passage that would facilitate the flow of water without causing deterioration of the roadway. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently provides a general equalization of flows to ENP. Although the bridges would be capable of conveying the required amount of

water, the existing culvert system would remain in place to promote an even distribution of flows across the project area. The L-29 Canal and its ability to provide conveyance and equalization of flows into ENP would not be adversely affected by the TSP. No structures would be placed in the L-29 Canal, and channel dimensions would not decrease. The net effects of the project would be beneficial.

The proposed drainage maintenance/flow equalization swales constructed at each of the remaining 15 sets of culverts would: 1) provide sufficient flow area to allow low velocities in the receiving marsh; 2) provide an extended area to reduce the localized effects of nutrient loading; and 3) correspondingly extend the time between required for maintenance of the culverts.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated effects until after completion of the ENP General Management Plan. The General Management Plan may not be completed until 2009.

4.4 WATER QUALITY

No-Action Alternative. As discussed in the 2005 RGRR/SEIS, retaining grassed side-slopes along the sides of the highway and the stormwater collection and treatment system on the bridges would result in no adverse effect on water quality.

Tentatively Selected Plan. The TSP would not alter water quality treatment. No adverse effects on water quality would occur.

4.5 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

No-Action Alternative. A Phase I Environmental Site Assessment (see Section 3.5) identified four sites with recognized environmental conditions.

Based on the results of the Phase I ESA (see Section 3.5), the USACE is considering:

- Monitoring the progress of an on-going state funded clean-up at Everglades Safari to ensure the eventual approval of a request for No Further Action and a Site Rehabilitation and Completion Order from the FDEP
- An assessment of potential petroleum contamination of the soil beneath certain portions of the asphalt pavement at Everglades Safari

- Requesting Coopertown to provide secondary containment for the drums of new and used motor oil
- Completion of an assessment of arsenic in the soil at Coopertown
- Completion of an assessment of the organic vapors detected at Gator Park
- An assessment of the extent of contaminants in the surface water adjacent to the Radio One access road.

Follow-up investigations are being considered to determine the extent of contamination and the cost for remediating contaminated sites.

Contractual documents for construction of the project would include a requirement that the contractor be watchful for potential contaminants. If contaminants are found during project construction, a safety zone would be established around the contaminated site, and the site would be remediated before construction could resume.

Tentatively Selected Plan. Effects of the TSP would not differ from those of the No-Action alternative.

4.6 ENVIRONMENTAL RESOURCES

4.6.1 Everglades National Park

No-Action Alternative. The No-Action alternative would promote the hydrologic restoration of ENP by providing additional passage of MWD flows and enhancing the hydroperiod. An approximate total of 57.5 acres of park land would be impacted by construction of this project. This includes: 31.2 acres of park land incorporated into the highway embankment, 4.2 acres of park land incorporated into the additional 5 ft of right-of-way, and 8.5 acres of park land incorporated into the culvert maintenance/flow equalization swales, and 13.6 acres impacted by bridge construction easements (Section 4.6.5).

Adverse impacts include those associated with the potential closings of airboat businesses adjacent to Tamiami Trail. Business owners in the area have indicated that Everglades Safari, Gator Park, and Coopertown provide airboat tours into ENP for up to 300,000 persons annually. With the inability to retain the airboat tour businesses as concessionaires. Additionally, many potential visitors would not have the opportunity to experience the Park.

Tentatively Selected Plan. Effects of the TSP would not differ from those of the No-Action alternative. However, because the TSP would enable construction to be started at an earlier date, benefits associated with MWD flows could be experienced sooner than could be provided by the No-Action alternative.

4.6.2 Shark River Slough (SRS) East and West Basins

No-Action Alternative. No-Action alternative would convey the desired MWD flows to SRS. Important especially during dry years, the restoration of hydrology in SRS would reduce the risk of ridge and tree island peat burning. Flows would be distributed through a two-mile hydraulic opening and a one-mile hydraulic opening, with the remaining culverts under Tamiami Trail assisting in promoting an even distribution of flows from the L-29 Canal to ENP.

Tentatively Selected Plan. The TSP would reduce the time until MWD flows would be provided.

4.6.3 Water Conservation Area 3B

No-Action Alternative. Under the MWD project, water would be delivered to the L-29 Canal from WCA-3B through five separate structures. The L-29 Canal would receive this water and act as a stage equalizer upstream of the highway embankment. The stage in the L-29 Canal under the MWD project would be dictated by water flowing through the bridge openings. The project would reduce prolonged inundation in WCA-3B.

Tentatively Selected Plan. The TSP would have the same effects as the No-Action Alternative. By proceeding with real estate acquisition to meet the schedule for Tamiami Trail construction, the TSP would expedite the onset of MWD implementation.

4.6.4 Biological Communities

No-Action Alternative. Biological community structure has become affected by the loss of pre-C&SF hydroperiods and a general reduction in water levels and flows in the Everglades. Construction and implementation would disrupt biological communities that have adapted to the existing conditions of the project area. However, implementation of the project would provide the opportunity for long-term improvements in the biological community structure not only in the project area but also in many thousands of acres in ENP. Increased conveyance through Tamiami Trail would provide greater hydrologic connectivity and more natural hydroperiods.

Ecological Connectivity. The project would increase ecological connectivity. Most of the CSOP alternatives propose construction of three new weirs in the L-29 levee. Two weirs would be placed in the western half of the Tamiami Trail project area, and one weir would be placed in the eastern half. These weirs were proposed independently of the development of the Tamiami Trail project.

Animals. Evaluation of the ability for the project to enhance wading bird foraging and nesting was based on the potential for restoring hydropatterns in NESS to increase abundance and availability of forage fish on which wading birds depend for nesting success. Natural hydropatterns increase fish abundance and availability to wading birds during the crucial nesting period.

Ecological connectivity between the L-29 Canal and ENP would be enhanced by construction of the bridges. Additionally, the project would provide an opportunity for minimizing retrofit when implementing aspects of CERP. Although there are no specific provisions made to reduce wildlife mortality, the bridge spans are anticipated to provide some reduction in mortality of wildlife crossing the Tamiami Trail, particularly at the eastern bridge where the 2004 FWS wildlife mortality survey revealed the highest incidence of mortality along the project (47 percent of deaths).

Tentatively Selected Plan. The TSP would have the same effects as the No-Action Alternative. By proceeding with real estate acquisition to meet the schedule for Tamiami Trail construction, the TSP would expedite the onset of MWD implementation, thereby providing restoration benefits sooner than the No-Action alternative.

4.6.5 Wetlands

No-Action Alternative. To determine the number of acres and vegetated wetlands affected by the project, Geographic Information Systems (GIS) technology compared the construction footprint of the Recommended Plan to the Florida Land Use, Cover, and Forms Classification System (FLUCCS) database (FDOT, 1999). FLUCCS codes used for the analysis were modified by the SFWMD in 2002. Although the tables below present a variety of data, all are derived from the same FLUCCS data and GIS analysis.

Table 4 shows the land uses, number of acres, and ownership of land impacted by the Recommended Plan. Implementing the project would involve a loss of 66.25 acres of vegetated wetlands. Removal of the existing highway embankment would allow the restoration of 25.31 acres of wetlands.

Therefore, construction of the project would result in a net loss of 40.94 acres of wetlands.

Table 4. Land Use Impacts of the Recommended Plan

Land Use Description	ENP Property	SFWMD Property	Private Property	Total Acres
Vegetated Wetlands				
Wetlands: Mixed Shrubs	28.94	3.05	1.14	33.13
Wetlands: Freshwater Marshes—Graminoid Prairie-Marsh	19.59	2.84	1.00	23.43
Wetlands: Freshwater Marshes—Sawgrass	8.17	0.72	0.80	9.68
SubTotal Wetlands:	**56.70**	**6.61**	**2.94**	**66.25**
Other Land Uses				
Urban and Built-up: Commercial and Services	0.23	0.26	1.25	1.74
Natural River or Stream	0.00	0.00	0.30	0.30
Communication Utilities	0.53	0.00	0.00	0.53
SubTotal Other Land Uses:	0.76	0.26	1.54	2.57
Total Acres Impacted by Project:	**57.46**	**6.87**	**4.48**	**68.82**

Sources: South Florida Water Management District, USACE.

These wetland impacts differ from those estimated in the 2005 RGRR/SEIS for Tamiami Trail. The 2005 RGRR/SEIS estimated that the Recommended Plan would involve a permanent loss of approximately 21.9 acres of wetlands, which would be incorporated into highway right-of-way. The 2005 RGRR/SEIS also projected that 17.1 acres of vegetated wetlands under the bridges would be lost due to shading, for a total vegetated wetland loss of approximately 39 acres. Subsequent to the completion of the 2005 RGRR/SEIS, several actions were undertaken that changed the analysis of wetland impacts. The USACE completed a detailed land survey of the project area, engineering and construction designs were refined to shift the highway right-of-way farther to the south, and other aspects of construction were enumerated that would fill or otherwise impact wetlands. Additional project features that would have an added impact on wetlands include: five feet of ROW possibly added to the top of the highway side slope to the south in order to comply with FDOT highway safety standards; culvert maintenance/flow equalization swales possibly added to the south side of existing culverts to reduce velocities in the receiving marsh; land cleared adjacent to the bridges to facilitate bridge construction; and the raising and widening of access roads to Radio One and Lincoln Financial Media to prevent flooding associated with

the MWD project. Table 5 shows the overall land impacts of these project features. Table 6 shows the impacts of project features on land owned by ENP.

Table 5. Land Use Impacts of Recommended Plan Components

FLUCCS Code and Description	Highway ROW[1]	Additional 5' FDOT ROW	Culvert Maintenance Swales	Radio One Access Road	Lincoln Financial Media Access Road	Bridge Construction Easements	Total
1400. Urban and Built-up: Commercial and Services	1.01	0.12	0.20	0.00	0.00	0.42	1.74
5102. Natural River or Stream	0.04	0.00	0.00	0.00	0.00	0.26	0.30
6172. Wetlands: Mixed Shrubs	17.18	2.39	8.27	0.04	0.00	5.25	33.13
6410. Wetlands: Freshwater Marshes--Graminoid Prairie-Marsh	13.99	1.06	0.33	0.34	0.29	7.42	23.44
6411. Wetlands: Freshwater Marshes--Sawgrass	6.15	1.10	0.45	0.69	0.04	1.26	9.68
8200. Communication Utilities	0.47	0.06	0.00		0.00	0.00	0.53
SubTotal--Wetlands Impacted:	37.32	4.55	9.05	1.06	0.33	13.93	66.25
Total Acres Impacted:	**38.84[2]**	**4.73**	**9.25**	**1.06**	**0.33**	**14.61**	68.82

[1] This column represents acreage that would be incorporated into the highway right-of-way, exclusive of a possible additional 5 feet.
[2]This figure includes 17.1 acres of vegetated wetlands under the bridges that would be converted to open-water aquatic habitat. This acreage would be subject to shading and not likely to revert to vegetated wetlands.

Sources: South Florida Water Management District, USACE.

Table 6. Impacts of Recommended Plan on ENP Land

FLUCCS Code and Description	Highway ROW[1]	Additional 5' FDOT ROW	Culvert Maintenance swales	Bridge Construction Easements	Total
1400. Urban and Built-up: Commercial and Services	0.12	0.01	0.00	0.11	0.23
6172. Wetlands: Mixed Shrubs	14.06	2.16	7.80	4.91	28.94
6410. Wetlands: Freshwater Marshes--Graminoid Prairie-Marsh	11.15	0.88	0.24	7.33	19.59
6411. Wetlands: Freshwater Marshes--Sawgrass	5.42	1.07	0.45	1.22	8.17
8200. Communication Utilities	0.47	0.06	0.00	0.00	0.53
SubTotal--Wetlands Impacted:	30.63	4.11	8.49	13.46	56.70
Total Acres:	**31.22**	**4.18**	**8.49**	**13.57**	**57.46**

[1] This column represents acreage that would be incorporated into the highway right-of-way, exclusive of a possible additional 5 feet.

Sources: South Florida Water Management District, USACE.

Offsetting these impacts, the additional bridge conveyance and water distribution associated with this project would enable the restoration of approximately 109,000 acres of wetlands of NESS within ENP. In addition to the restoration of wetlands through the removal of embankment, wetland habitats in ENP would be improved through the restoration of deep sloughs in NESS and the promotion of sheetflow downstream of the bridges and culverts.

Tentatively Selected Plan. The TSP would have the same effects as the No-Action Alternative. By proceeding with real estate acquisition by the USACE to meet the schedule for Tamiami Trail construction, the TSP would expedite the onset of MWD implementation, thereby providing restoration benefits sooner than the No-Action Alternative.

4.6.6 Protected Species

No-Action Alternative. The 2005 FWCAR referenced six threatened or endangered species in the project area: Cape Sable seaside sparrow (CSSS), eastern indigo snake, Florida panther, snail kite, West Indian manatee, and wood stork. FWS and the Florida Fish and Wildlife Conservation Commission (FWC) also identified the Frog City wading bird colony as potentially requiring protective measures during construction.

The CSSS, a Federally-listed endangered species, is currently being protected under the Interim Operational Plan as described in the May 2002 IOP FEIS. As part of the FWS 1999 Biological Opinion on the project, Reasonable and Prudent Alternatives (RPAs) were developed to "preclude jeopardy" to the CSSS. Since March 2002, 60 percent of all regulatory water releases crossing Tamiami Trail have been required to occur east of the L-67 Extension. However, when water levels in eastern ENP measured at G-3273 have exceeded 6.8 ft, discharges to ENP east of the L-67 Extension have not been permitted. When the 6.8-foot stage was reached, all regulatory and stormwater releases occurred in the west basin through the S-12 structures. The No-Action alternative would be capable of passing sufficient flow through their respective hydraulic openings that would satisfy the RPAs of the 1999 BO for the CSSS.

The 2005 FWCAR requested the implementation of *Standard Protection Measures for the Eastern Indigo Snake* during construction. With the implementation of these standards, the No-Action alternative is not likely to adversely affect the eastern indigo snake.

The FWCAR accompanying the 2005 RGRR/SEIS mentioned the presence of a Florida panther near the project area. A two-year old, male Florida panther was discovered through radio-telemetry data to have ranged as close as one-half mile south of Tamiami Trail in 2001. The USFWS determined that formal consultation under Section 7 of the Endangered Species Act would be necessary to assess the effects of habitat loss on the Florida panther. Under the recent panther consultation protocols, any loss of habitat greater than five acres in the primary habitat zone must undergo formal consultation. Informal consultation with USFWS is ongoing.

Based on the most recent snail kite nesting data, the closest snail kite nest to the Tamiami Trail is located in WCA-3B north of the project. FWS has not recommended any specific precautions be implemented regarding further protection of the snail kite. Implementation of the project is not likely to adversely affect the snail kite.

It is highly unlikely that the West Indian manatee occurs in the project area. Because no work will be performed in the L-29 Canal, no adverse effects on the manatee are anticipated. The USACE has agreed to provide for manatee protection procedures in its construction contracts.

There are two nesting wood stork colonies located in the vicinity of Tamiami Trail: the Tamiami West Colony and the smaller Tamiami East Colony. The FWS has applied the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Ogden 1990) to designate primary and secondary

management zones for both colonies. The primary zone is the most critical area and must be managed according to recommended guidelines to insure the colony's survival. Restrictions in the secondary zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The FWS has designated the primary zone for these colonies as including a distance of 1,000 feet extended in all directions from the colony boundaries. The secondary zone includes the area between the 1,000 and 2,000 feet radii that encircle both colonies.

The existing Tamiami Trail runs through the primary zone of the Tamiami West Colony and through the secondary zone of the East Colony. Highway construction would occur within these respective zones as well. No bridge construction would occur within the wood stork protection zones. However, one culvert maintenance swale impact .63 acres within the primary zone of the West Colony. A second culvert maintenance swale would impact .69 acres in the secondary zone of the East Colony. The following FWS guidelines for the primary and secondary zones of the Tamiami West and East rookeries would be followed:

1. **Primary Zone:** In the Tamiami West Colony, from February (or onset of nesting activity) through the onset of the rainy season (or when the young have fledged), highway construction (e.g., heavy human/equipment activity, pile driving, blasting) should not be permitted in the reach of the highway affected by that alternative.

   The Primary Zone of the Tamiami East Colony would not overlap the Tamiami Trail project. Thus, no wood stork Primary Zone restrictions apply to highway construction activities in the vicinity of this colony, unless otherwise determined to be necessary by a qualified onsite observer(s).

2. **Secondary Zone:** No unauthorized human activity (on foot, airboat, or off-road vehicle) should occur at any time of the year within the reach of highway affected by that alternative on the south side of the highway and particularly during the nesting season.

3. **Length of Restrictions:** These restrictions shall remain in effect during the construction phase of the Tamiami Trail Project.

4. **Qualified Observer:** Subject to the approval of the FWS and FWC, a qualified observer(s) shall be stationed onsite during the construction phase of the Tamiami Trail Project. The observer

shall monitor wood stork activity and shall notify FWS, FWC, and the USACE if wood stork behavior is modified such that roosting, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with.

5. **Modification of Restrictions:** If new information becomes available concerning the Tamiami West Wood stork colony, the USACE, FWS and FWC should immediately contact each other to determine what modifications, if any, are warranted.

The Frog City rookery, which supports nesting by tricolored herons and great egrets, is located in WCA-3B close to the L-29 Levee approximately one-quarter mile west of the Tigertail Camp. Because project is located south of the L-29 Levee/Canal, FWS and FWC did not recommend that any Buffer Zone restrictions be applied to the Frog City colony. The colony is protected from construction noise by the approximately 20-foot-high L-29 Levee, and the wading birds nesting at this colony have acclimated to continuous highway traffic and noise. Therefore, no adverse impacts to the rookery are anticipated.

Because construction activities would be restricted to the immediate vicinity of the highway, no adverse effects on the American alligator, the Everglades mink, or any wading birds are expected.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated impacts until after completion of the ENP General Management Plan.

4.7 CLIMATE

No effect on climate would result with or without implementation of the project.

4.8 AIR QUALITY

No-Action Alternative. As described in the 2005 RGRR/SEIS, carbon monoxide (CO) would increase during the period from baseline, existing conditions through the design year from 4.8 parts per million (ppm) to 5.0 ppm at the Osceola Camp (a 4.2 percent increase) and from 4.0 ppm to 4.8 ppm (a 20 percent increase) at the Tigertail Camp. The increased

concentrations are due solely to the projected increases in traffic volume. At neither location do the projected increases exceed the National Ambient Air Quality Standard (NAAQS) eight-hour standard of 9.0 ppm.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated impacts until after completion of the ENP General Management Plan.

4.9 PUBLIC RECREATION

No-Action Alternative. Impacts to non-commercial recreation (e.g., private airboating, fishing, wildlife viewing, etc.) would be minor. Access to boat ramps via S-333 and S-334 would not be affected. No effect on bank fishing access to the north bank of the L-29 Canal is anticipated.

Bank angling losses at the bridge locations on the south side of the highway would be more than compensated for by the north side of the canal, which would not be impacted by the project and which would provide a safer location away from traffic. However, access to the north side of the canal via the unpaved road is not as convenient as via the paved highway. On the south side of the highway, only culvert fishing is possible because there is no other open water. These locations would be decreased where bridges replace culverts. However, indications are that the existing 19 culvert sites are not nearly saturated with anglers.

Although the use of shoulders for temporary lanes would preclude parking on roadsides in the construction area, a method of "rolling construction" would be employed, and impacts from construction would be localized. Bank fishing from the Tamiami Trail would not be available at construction sites during the 36-month construction period. After the completion of construction, bank fishing from the roadway in the L-29 Canal at culvert outfalls could resume fully. Because the roadway embankment would be removed from bridge locations, there would be a net loss of bank fishing opportunity.

Two boat ramps used for private airboating, located adjacent to Coopertown and near the L-67 Extension would be lost. Otherwise, non-commercial recreational airboating and related activities would not be affected.

Recreational airboating offered through local businesses would be adversely affected, as discussed in Section 4.14, Effects on Businesses, and Section 4.15, Effects on Ecotourism.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated impacts until after completion of the ENP General Management Plan.

4.10 CULTURAL RESOURCES

No-Action Alternative. Construction of the highway and bridges would affect historic structures.

1. Tamiami Trail (8DA6765): The No-Action alternative would result in a major modification of the highway. Raising the road elevation would require an expansion of the road embankment and associated right-of-way on the south side of the existing highway. Bridges would be constructed to replace three miles of highway.

2. Tamiami (L-29) Canal (8DA6766): The L-29 Canal would not be affected by the project.

3. Coopertown Airboat Rides and Restaurant (8DA6767): The construction right-of-way required for reconstruction of the highway would result in the taking of the entire parking area (Figure 16). It would likely not be possible for the business to remain in operation.

4. Airboat Association of Florida (8DA6768): Additional right-of-way required for construction would encroach on property belonging to the Airboat Association. The site would be inconvenienced by highway construction, but members would continue to have access to the property. The USACE proposes to obtain a perpetual flowage easement from the Airboat Association.

In addition to the construction impacts associated with the No-Action alternative, project would include the acquisition of real estate interests affected by inundation from increased flows and water elevations associated with the MWD project. Most of the property at Coopertown Airboat Rides lies below an elevation of 10.1 ft. Increased flows associated with operation of the MWD project would place property at risk of flooding (figures 17 to 19).

This would also necessitate the Federal government acquiring the Coopertown site.

Project implementation would result in an increase in the elevation and duration of water on approximately 10 acres of the Airboat Association of Florida property below the 10.1-foot elevation that would be experienced at the 100-year stage. The USACE would obtain a perpetual flowage easement because of the impacts of induced flooding.

Measures to compensate for the loss or alteration of historic structures would include the placement of historic markers at various areas of significance along the Tamiami Trail. The markers would include photographs, maps, and narratives. Adequate provisions would be made for pulloff and parking at historic markers.

Should construction activities uncover any unanticipated archaeological finds, activity in the immediate area of the find will be stopped and the USACE notified. Construction will not continue until the site finds are evaluated by a professional archaeologist and the USACE provides a notice to proceed.

In the event that human remains are found during construction or maintenance activities, the provisions of *Chapter 872, Florida Statute (872.05)* will apply to the extent there exists a waiver of Federal sovereignty. *Chapter 872, Florida Statute* states:

> *When human remains are encountered, all activity that might disturb the remains shall cease and may not resume until authorized by the District Medical Examiner (if the remains are less than 75 years old) or the State Archaeologist (if the remains are more than 75 years).*

If Native American remains are encountered, provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) may apply.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated impacts until after completion of the ENP General Management Plan.

4.11 AESTHETICS

No-Action Alternative. The removal of exotic vegetation on the southern side of the Tamiami Trail would be necessary for construction of the road and bridges. Bridges may enhance the aesthetic quality of the area by offering a view of the expanse of the Everglades within the project corridor.

Tentatively Selected Plan. Effects on aesthetics would not differ from the No-Action alternative.

4.12 NOISE ENVIRONMENT

No-Action Alternative. Noise modeling performed for the 2005 RGRR/SEIS concluded that the project would have little or no impact on the baseline, future without project, or future with project noise environment at sensitive receptor sites located at the Osceola and Tigertail camps. The model also predicted no noise impact on the Flight 592 Memorial.

Construction and vibration noise generated during project construction would cause temporary impacts through increased noise levels near the receptors. Noise emissions from construction equipment range generally from 70 dBA for pumps and portable equipment to approximately 95 dBA for tractors, graders, and other heavy equipment. Construction of bridge supports would entail the use of pile driving. There is a possibility that pile driving activity could cause disturbance to nearby rookeries.

Avoidance and/or mitigation options will be developed during the project development and design phases and specified in construction plans in accordance with FDOT's *Standard Specifications for Road and Bridge Construction*.

Tentatively Selected Plan. Effects on the noise environment would not differ from the No-Action Alternative.

4.13 ECONOMIC EFFECTS OF CONSTRUCTION EXPENDITURES

No-Action Alternative. Analyses in the 2005 RGRR/SEIS using the IMPLAN model concluded that the Recommended Plan would stimulate economic activity in the region through short-term construction activities. IMPLAN is a regional impact model that enables the evaluation of the economic impact of specific activities such as construction of public works projects. IMPLAN was used in this analysis to estimate the economic impacts of the proposed project as measured by expected increases in business activity, personal income, and employment. The IMPLAN model for Miami-Dade County indicated that

each million dollars in construction expenditures would result in an expected increase of $2.179 million in business sales, $0.969 million in personal income, and 22 jobs within the local economy.

Tentatively Selected Plan. Effects of the TSP would differ from those of the No-Action alternative by the timing of the impacts. Under the TSP, the USACE would initiate property acquisitions in 2007, with construction beginning shortly thereafter. The No-Action alternative would delay the start of the project and its associated economic benefits until after completion of the ENP General Management Plan.

4.14 EFFECTS ON BUSINESSES

No-Action Alternative: Six privately owned businesses along the south side of Tamiami Trail would be impacted by construction of the No-Action Alternative and by flooding associated with MWD operations. Under the No-Action Alternative, the acquisition of real estate interests would be handled by NPS following completion of the ENP General Management Plan, ENP is also evaluating retaining the airboat touring businesses as Park concessions

1. **Lincoln Financial Media:** Lincoln Financial Media (LFM) is a subsidiary of Lincoln National Corporation, which owns radio and television stations in the United States. LFM's property south of Tamiami Trail includes both radio towers and buildings. A portion of the access road to the property would be required for construction. LFM would be impacted by flooding at the 100-year stage associated with the MWD. For the facility to remain functional, necessary modifications to existing structures would include access roads as well as communication towers and buildings in order for those facilities to remain functional. Although the land would most likely need to be acquired in fee by the government, new appraisals are expected that would assess not only the cost of modifying the existing buildings and radio towers, but also the property's "greater estate," which includes off-site radio studios that rely on the radio towers adjacent to Tamiami Trail. If new appraisals reveal that finding structual solutions would be more economical than acquiring the property through fee, fee for the highway and a minimum of a perpetual flowage easement would be acquired. The No-Action alternative assumes that real estate actions would be handled by NPS.

2. **Everglades Safari:** The business' parking lot would be eliminated to enable construction of the western bridges (Figure 8). Additionally, most of Everglades Safari would be

expected to flood at the 50 percent daily stage duration (Figure 9) and at the 10- and 100-year stage frequencies for MWD operations (figures 10 and 11). The business would likely be acquired in fee by the government. The No-Action alternative assumes that the NPS would acquire the necessary real estate interests in private land parcels.

3. **Gator Park:** This business would lose a portion of its parking lot immediately adjacent to Tamiami Trail for construction of the No-Action Alternative (Figure 12). Additionally, some of the property would be affected by the 50 percent daily stage duration of 8 ft (Figure 13). The property would incur extensive flooding during the 10- and 100-year stage frequencies associated with MWD operations (figures 14 and 15). At a minimum, a perpetual flowage easement and fee for the highway would most likely be obtained. The No-Action alternative assumes that the NPS would acquire the necessary real estate interests in private land parcels.

4. **Cooper town Airboat Tours and Restaurant:** The parking lot would be taken to widen Tamiami Trail, and the business would not be able to operate during construction (Figure 16). Additionally, the property would be affected by induced flooding at the 50 percent daily stage duration (Figure 17) and the 10- and 100-year stage frequencies (figures 18 and 19). It would be necessary for the government to acquire the land through fee. The No-Action alternative assumes that the NPS would acquire the necessary real estate interests in private land parcels.

5. **Radio One Communications:** Radio One, a radio broadcasting company, includes communication towers and buildings on its property. A portion the property would be required for construction of the project. Under MWD flows, Radio One is projected to be impacted by flooding at the 100-year stage associated with the MWD. Although the land would most likely need to be acquired in fee by the government, new appraisals are expected that would assess not only the cost of modifying the existing buildings and radio towers, but also the property's "greater estate," which includes off-site radio studios that rely on the radio towers adjacent to Tamiami Trail. If new appraisals reveal that finding structual solutions would be more economical than acquiring the property through fee, at a minimum, a perpetual flowage easement would be acquired. The No-Action alternative assumes that real estate actions

would be handled by NPS. The No-Action alternative assumes that the NPS would acquire the necessary real estate interests.

6. **Florida Power and Light:** Commonly referred to by its initials FP&L, this is a Florida-based power utility. There are no power lines located at this property. A fee for the highway would be needed. Additionally, a minimum of a perpetual flowage easement would be needed at the 100-year stage for restored water flows. The No-Action alternative assumes that the NPS would acquire the necessary real estate interests.

The No-Action Alternative would enable the airboat tour businesses to remain in operation until such time as the ENP General Management Plan has been completed (estimated to be 2009) (See Section 1.5.11). At that time the ENP would have an opportunity to consider allowing the businesses to remain in operation as concessionaires.

Tentatively Selected Plan: The TSP would involve acquisition of real estate interests by the USACE rather than by NPS. Acquisition of real estate interests by the USACE would begin in 2007.

4.15 EFFECTS ON ECOTOURISM

The airboat businesses on Tamiami Trail—Everglades Safari Park, Gator Park, and Coopertown Airboat Rides—draw a large influx of state, national, and international tourists to this area of ENP every year. Therefore, the effects of reconstructing the Tamiami Trail on these businesses would adversely affect the area's ecotourism industry. The three operations cumulatively bring in approximately 300,000 visitors annually, with peak numbers occurring in the winter months. Business owners have reported that these numbers are growing steadily every year.

The Tamiami Trail businesses provide a convenient day excursion for tourists via commercial tour operators in Miami. A substantial portion of ecotourism by airboat into ENP is fed by cruise ship excursions from the Port of Miami, mainly through Royal Caribbean and Carnival cruise lines. Managers of these cruise lines reported in interviews that airboating tours in the Everglades are by far the most popular excursion among their passengers when docked at the Port of Miami.

No-Action Alternative. As explained in Section 4.14, Effects on Businesses, construction impacts, right-of-way requirements, and induced flooding would adversely affect the airboat touring businesses. Everglades Safari Park and Coopertown Airboat Rides would be affected by construction impacts as well

as by flooding induced by MWD flows; it is concluded that these two businesses would be unable to continue operations, and that the Federal Government would acquire these properties through fee. A large portion of the Gator Park property would also be flooded at the 100-year stage water level. Rather than purchase the property, a perpetual flowage easement from Gator Park would be the minimum required.

Business owners forecasted that the closing of Everglades Safari and Coopertown could significantly limit tourism options because accessing alternate tourism destinations in the south side of the park would require significantly more travel time. At least some of the loss of airboat tourism capacity at Coopertown and Everglades Safari might be absorbed by expansion of the facilities at Gator Park. In addition, just to the west of the project corridor, airboat tours into WCA-3A are offered at the Miccosukee Village; capacity at this facility might be expanded.

The No-Action alternative assumes that the ENP would acquire all airboat tour properties following completion of the ENP General Management Plan, which is anticipated to take place in 2009. At that time ENP would have the opportunity to evaluating retaining the airboat touring businesses as Park concessions (see Section 1.5.11).

Tentatively Selected Plan. The TSP calls for the USACE to imitate acquisition of real estate interests beginning in 2007. Closure of businesses and adverse effects on ecotourism would occur sooner than would occur under the No-Action alternative.

4.16 AIRBOAT ASSOCIATION OF FLORIDA

The Airboat Association of Florida is a non-profit conservation and outdoor recreation organization. The site is located approximately 3.5 miles from the western end of the project corridor. All alternatives include provisions for maintaining access to the site. During construction, the flow of traffic on the Tamiami Trail would be maintained; however, motorists accessing the site may experience temporary delays because of traffic control measures. The association would also be affected at the 100-year stage of expected water levels associated with the MWD. A minimum of perpetual flowage easement would be required. Additional right-of-way for the highway would be acquired in fee. Effects of the No-Action alternative and the TSP would be the same.

4.17 OSCEOLA AND TIGERTAIL CAMPS

Under both the No-Action alternative and the TSP, access to the Osceola and Tigertail Camps would be provided during construction and following completion of the project. Short-term traffic disruptions and noise would be created by construction. Neither camp would be affected by higher water level under the two alternatives; the Tigertail Camp was previously elevated to avoid flooding. ENP is currently coordinating with the Osceola family on an agreement for raising the camp. Raising of the camp will be done by the USACE.

4.18 FLIGHT 592 MEMORIAL

No impacts on the Flight 592 Memorial are expected. Access to the site would be provided.

4.19 ENVIRONMENTAL JUSTICE AND IMPACTS ON CHILDREN

An environmental justice analysis, which is intended to "analyze and address the distributional effects of environmental impacts on certain populations," is included to address the requirements of Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The purpose of the EO is to prevent the impacts of an action from falling disproportionately on minority or low-income communities. A determination that disproportionate impacts are evident can be subjective and a matter of legal interpretation. Disproportionate impacts occur when, in order to minimize or avoid impacts to another community or environmental resource, the impacts are instead focused on the minority or low-income community.

Neither the No-Action alternative nor the Tentatively Selected Plan are expected to create long-term adverse impacts to the Tigertail or Osceola camps. Likewise, no disproportionate impacts are expected.

4.19.1 Impacts on Children

An investigation of environmental health risks and children is included to comply with the intent of EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Data used to characterize the population within the affected area were obtained from local resources through interviews.

No increased environmental health or safety risks to children in either Tigertail or Osceola camps are expected.

4.20 CUMULATIVE IMPACTS

Cumulative impacts are defined in 40 CFR 1508.7 as those impacts that result from:

> *...the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

This project is one component of the MWD project, which would restore to the extent practicable a portion of the Everglades ecosystem. This effort is also tied into the Central and Southern Florida Project Comprehensive Restudy, now referred to as the Comprehensive Everglades Restoration Project (CERP). Table 7 lists several other past, current, and projected efforts that cumulatively affect the Southeastern Florida/Southern Everglades regional environment.

Collectively, all the actions listed in Table 7 are needed to achieve the greatest possible hydrologic restoration of the southern Everglades. Virtually all the actions have been incorporated into the CERP analysis, which was designed to consider the entire South Florida ecosystem. In doing so, the hydrologic conditions of the area were modeled on a broad scale. In the hydrologic modeling analysis, a set of performance measures was applied to ecological targets to determine the restoration benefits of the hydrologic improvements. The CERP analysis also included some fundamental assumptions about the future status of the MWD project and other on-going projects within the ecosystem prior to completing the CERP modeling. It was assumed that the MWD project was in place as designed and providing the expected flows to NESS. No adverse environmental impacts were identified.

Table 7. Projects with Cumulative Effects on Southeastern Florida/ Southern Everglades Regional Environment

Project	Responsible Agency
Past Actions	
Modified Water Deliveries to Everglades National Park – Raising Tigertail Camp	USACE/ENP
Experimental Program of Water Deliveries to Everglades National Park – Test Iterations 1-5 (Shark River Slough)	USACE
Experimental Program of Water Deliveries to Everglades National Park – Test Iteration 6 (Taylor Slough)	USACE

Project	Responsible Agency
Experimental Program of Water Deliveries to Everglades National Park – Test Iteration 7 (modified Taylor Slough)	USACE
Interim Structural and Operational Plan (ISOP) for the Hydrologic Compliance with the Cape Sable Seaside Sparrow Biological Opinion	USACE
Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow,	USACE
Current Actions	
Experimental Program of Water Deliveries – Emergency Deviation from Test Iteration 7, Interim Structural and Operational Plan	USACE
Modified Water Deliveries to Everglades National Park – Conveyance between WCA-3A and WCA-3B (Conveyance and Seepage Control Project)	USACE/ENP
Modified Water Deliveries to Everglades National Park – 8.5 Square Mile Area	USACE/ENP
South Dade (C-111) Project	USACE
Additional Lands – 8.5 SMA (Willing Seller Land Acquisition Program)	FDEP
East Coast Buffer/Water Preserve Areas Project	SFWMD
Lower East Coast Regional Water Supply Interim Plan	SFWMD
Future Actions	
Comprehensive Everglades Restoration Plan	USACE/ SFWMD
Experimental Program of Water Deliveries – Emergency Deviation from Test Iteration 7 – Interim Operational Plan	USACE
Combined Structural and Operational Plan (CSOP)	USACE
Everglades National Park General Management Plan	ENP
Lower East Coast Regional Water Supply Plan – South Florida Ecosystem Restoration Plan	SFWMD

Source: U.S. Army Corps of Engineers.

WRDA 2000 provided the approval of CERP as a framework and guide for modifications to the C&SF Project needed to restore the South Florida ecosystem and to provide for the other water-related needs of the region. WRDA 2000 also authorized the construction of four pilot projects (two pilot projects already authorized in WRDA 99) and ten initial projects needed to provide, in the short term, system-wide water quality and flow distribution benefits as well as an adaptive assessment and monitoring program. In addition, WRDA 2000 provided authorization for a Programmatic Authority to implement small restoration projects (less than $25 million).

Implementation of this project as a predecessor of the larger CERP action would result in a sustainable South Florida through the restoration of the ecosystem, ensuring reliable water supplies and providing flood protection. Therefore, the TSP for Tamiami Trail Modification is expected to contribute to a net beneficial cumulative impact.

4.21 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Both the No-Action alternative and the TSP would require irreversible and irretrievable commitments, which would include the expenditure of funding, energy, labor, and materials. The project would not cause the permanent removal or consumption of any renewable resources. However, implementation would commit lands and resources for channel enlargement, excavated material disposal areas, and other project features.

4.22 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The No Action TSP and have unavoidable adverse direct and indirect environmental effects that are discussed in this document and its appendices. Approximately 66 acres of wetlands would be impacted by the Recommended Plan.

4.23 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Long-term benefits and short-term adverse environmental impacts represent tradeoffs between the local short-term use and the long-term stability and productivity of the environment. Long-term enhancements in productivity result from improved hydrologic conditions and enhanced biological community structure in the Everglades.

Short-term uses associated with the TSP include construction resources, dollars, and labor expended during road construction. They also include the short-term construction-related impacts to traffic flow, businesses, and residents, as discussed in this document.

The long-term beneficial effects to the Everglades resulting from the implementation of this project and the remaining MWD actions would greatly outweigh any unavoidable adverse impacts. While the project would result in a net loss of approximately 66 acres of wetlands, it would benefit over 100,000 acres of wetlands, primarily in ENP.

4.24 SECONDARY IMPACTS

Secondary impacts involve those linked to the project but that occur subsequent to construction. Secondary impacts of the project on specific environmental resources are discussed throughout Section 4.0, Environmental Effects of Alternatives. The Tamiami Trail Modifications project is a component of the overall MWD project, which is intended to facilitate hydrologic restoration of the Everglades by providing additional water to NESS. For hydrologic restoration to be achieved in a timely manner, the Tentatively Selected Plan must be implemented. The intent of the project, therefore, is to facilitate beneficial secondary impacts, which would consist of improvements to the Everglades ecosystem.

4.25 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

This project has been coordinated with agencies of Federal, state, and local governments. Agency representatives have participated in workshops, meetings, and other project-related activities, and have provided reviews of this document. There is no known incompatibility with the objectives of Federal, state, or local entities.

4.26 CONFLICTS AND CONTROVERSY

A main area of controversy associated with this project involves construction and flooding impacts on businesses south of the Tamiami Trail. ENP and fishing and sporting organizations have expressed particular concerns about the possible loss of airboat tour operations.

Opposition to the project may occur from the residents of the Miccosukee Tribe of Indians, local businessmen, and recreational fishermen over potential loss of privacy, impacts on businesses, the loss of some recreational access, and reduced ecotourism. Some environmental organizations may argue that this project offers insufficient benefits to the Everglades ecosystem.

Expansion of the highway right-of-way south into ENP is controversial among environmental advocacy organizations and members of the general public.

4.27 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

Coordination and evaluation of required compliance with specific Federal acts, executive orders, and other policies for the various alternatives was

achieved, in part, through the coordination of this document with appropriate agencies and the public. This compliance was established in conjunction with the 1992 GDM/EIS, the 2003 GRR/SEIS, and the 2005 RGRR/SEIS. Appendix D documents compliance with all applicable Federal statutes, executive orders, and policies; Table 8 summarizes the level of compliance with those statutes, orders, and policies.

Table 8. Compliance with Environmental Laws, Regulations and Executive Orders, Tamiami Trail RGRR, Recommended Alternative

Law, Regulation or Policy	Status C, PC, NC	Comments	Full Compliance Expected
Clean Air Act	C	Sec. 309: Draft SEIS is being coordinated with public and agencies between Mar. 17 and May 7, 2007. EPA will rate the document. Sec. 176: No permanent sources of air emissions are part of the recommended plan.	Compliant at present. Final compliance would be achieved after coordination of Final SEIS.
Clean Water Act	PC	404(b)(1) Evaluation is included in Draft SEIS; WQC will be required (State permit); NPDES non point source permit will be required (State delegation); Project will comply fully with state criteria.	Full compliance upon issuance of the WQC and NPDES permits by the state.
National Environmental Policy Act of 1969	PC	Draft SEIS is being coordinated between Mar. 17 and May 7, 2007. EPA will rate the document.	Full compliance upon coordination of the final SEIS, public outreach activities completed, and signing of the ROD.
Fish and Wildlife Coordination Act of 1958	C	FWS and DOI are active team participants and have provided info. on fish and wildlife elements on project.	
Endangered Species Act of 1973	PC	FWS has informally concurred with Corps 26 Aug 05 determinations of "not likely to adversely affect" for all listed species except the Florida Panther. Consultation on loss of panther habitat along S. margin of TT is ongoing FWS provided full cooperation in preparation of an amended Biological Opinion.	A FWS determination of effects on the panther is expected Before ROD is signed.

Law, Regulation or Policy	Status C, PC, NC	Comments	Full Compliance Expected
Magnuson-Stevens Fishery Mgt Act	NA	Inland project that provides no change in water flows would not affect Essential Fish Habitat in palustrine, estuarine, and marine areas; NMFS will accept FSEIS as the EFH assessment.	
Fishery Conservation and Management Act	PC	The project has been coordinated with NMFS	Full compliance after review of the final SEIS by NMFS.
Coastal Zone Management Act o f 1972	PC	Based comments on the 2005 RGRR/SEIS provided by state reviewing agencies, the State has indicated that at this stage, the project is consistent with the Florida Coastal Zone Management Program.	Additional consistency review by the State will occur during coordination of the final SEIS. Full compliance will occur with issuance of the WQC by the State.
Coastal Barrier Resources Act and Coastal Barrier Improvement Act	NA	There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts do not apply.	
Marine Mammal Protection Act	PC	West Indian Manatee not likely to be adversely affected.	Full compliance after review of the final SEIS by USFWS.
Marine Protection, Research and Sanctuaries Act	NA	The term "dumping" as defined in the Act (3[33 U.S.C. 1402](f)) does not apply to this project. Therefore the MPRSA does not apply.	
Estuary Protection Act of 1968	NA	It is not anticipated that estuaries would be adversely affected by this project.	
Anadromous Fish Conservation Act	NA	Anadromous fish species would not be affected. The project has been coordinated with NMFS.	
Migratory Bird Treaty Act and Migratory Bird	C	No migratory birds would be affected by project activities.	

Law, Regulation or Policy	Status C, PC, NC	Comments	Full Compliance Expected
Conservation Act			
Wild and Scenic River Act of 1968	C	No designated Wild and Scenic river reaches would be affected by project related activities.	
Federal Water Project Recreation Act	C	The principles of this Act (PL 89-72) have been fulfilled by complying with the recreation cost sharing criteria as outlined in Section 2 (a), paragraph (2).	
Submerged Lands Act of 1953	NA	The project would not occur on submerged lands of the State of Florida. This Act does not apply.	
Rivers and Harbors Act of 1899	C	The proposed work would not obstruct navigable waters of the United States.	
National Historic Preservation Act of 1966 and the Archeology and Historic Preservation Act	PC	SHPO coordination has been initiated; Tamiami Trail, the Tamiami Canal, and Coopertown have been identified as eligible for NRHP listing; SHPO will enter into a Memorandum of Agreement to document historic structures	Full compliance by completion of final SEIS.
RECRA, CERCLA, Toxic Substances Control Act of 1976	C	No sites have been identified. The initial survey indicates that problems are unlikely.	
Farmland Protection Policy Act of 1981	C	Project site is surrounded by public and Tribal lands. No farmlands are present at the project site.	
E.O. 11988 Floodplain Management	NA	Bridging and widening would be minor modifications to existing floodplain to promote hydrologic restoration of ENP. Project site is surrounded by public lands.	
E.O. 11990 Protection of Wetlands	C	The areas proposed for Tamiami Trail bridging and widening, culvert maintenance swales, and access roads are a mosaic of wetlands with small tree island uplands. A net loss of 66 acres of	

Law, Regulation or Policy	Status C, PC, NC	Comments	Full Compliance Expected
		wetlands is expected, but an overall gain of 109,000 acres is expected to be restored because of restored water flows.	
E.O. 12898 Environmental Justice	C	This E.O. requires consideration of, and avoidance of disproportionately adverse effects on minority and low-income populations. The Miccosukee tribal populations of the Osceola and Tigertail camps will be avoided. Tigertail Camp has been raised to avoid adverse high water impacts. Osceola Camp is scheduled for raising. .Subsistence fishing will not be adversely affected.	
E.O. 13089 Coral Reef Protection	NA	This project will not adversely impact coral reefs or coral reef resources.	
E.O. 13112 Invasive Species	C	Project is not expected to lead to propagation of invasive species.	

Note: C: Complies fully; PC: partial compliance due to plan development; NC: non-compliant; NA: not applicable.

Source: USACE.

Section 5.0
UNRESOLVED ISSUES

At the time of publication of this Draft SEIS, three issues remain unresolved.

5.1. SUPPLEMENTAL FEATURES OF THE PROJECT

As described in Section 2.3.1, Highway and Bridge Construction, three features have been proposed for incorporation into the project: culvert maintenance swales, an additional five feet of right-of-way to comply with FDOT canal safety requirements, and bridge construction easements. All three features are currently being coordinated with ENP.

5.2 REAL ESTATE

Section 2.2.2, Real Estate, Section 2.4, Retaining Businesses, and Section 4.14, Effects on Businesses, discuss proposed real estate actions to be taken regarding private properties located in the project area. Some uncertainty remains on what real estate interests are required by the USACE. Real estate issues are unlikely to be resolved until appraisals have been completed. Coordination between the USACE and ENP on this issue has been ongoing.

5.3 FLORIDA PANTHER CONSULTATION

Design refinements and the possible incorporation of additional features into the project have resulted in more impacts on potential Florida panther habitat than were determined in the 2005 RGRR/SEIS (See Section 4.6.5, Wetlands). Evaluations are continuing on whether the additional impacts justify reopening formal consultation for the Florida panther under Section 7 of the Endangered Species Act.

Section 6.0
PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION

6.1 PUBLIC INVOLVEMENT

In compliance with USACE policies and NEPA, input on projects is solicited from the public and other government agencies. The public was invited to comment during the scoping process and in public meetings, and comments were solicited for this document.

6.2 NOTICE OF INTENT

A Notice of Intent (NOI) to prepare A Real Estate Supplement and Third Supplemental Environmental Impact Statement on Tamiami Trail Modifications, Modified Water Deliveries to Everglades National Park was published in the Federal Register on May 26, 2006.

6.3 SCOPING

Scoping is the phase in the NEPA process whereby the initial scope of issues to be analyzed in the EIS is determined. This phase occurs as early in the process as possible and is intended to obtain the views of the public and other interested agencies regarding the scope of the study.

A Notice of Intent to prepare the SEIS was published in the Federal Register, Volume 71, Number 102, on May 26, 2006. On June 19, 2006, the USACE prepared a scoping letter inviting potentially interested individuals, agencies, and organizations to send written statements expressing their questions and concerns regarding the proposed project. Comments and concerns received in response to the scoping letter are summarized in the following paragraphs.

Impacts on Businesses along the Roadway. Existing businesses along the south side of the roadway may be adversely impacted by the project. The following agencies and organizations expressed concerns regarding the affected businesses:

- Representatives of the South Florida Anglers for Everglades Restoration (SAFER) voiced concerns over negative impacts on the Airboat Association of Florida (AAoF), Coopertown, Gator Park, and Everglades Safari. The organization is apprehensive about unfavorable impacts on the tourist industry should these businesses be adversely impacted.

- A representative of the Florida Power and Light Company (FPL), a utility company providing electric power throughout Florida, expressed concern over proposed acquisitions of FPL property where the company has existing and planned electrical facilities.
- A representative of the Everglades Coordinating Council (ECC), an umbrella organization of sportsmen's conservation associations, shared her concerns regarding the AAoF and the other airboat operations that will be affected.
- A representative of the ENP voiced his preference to "maintain the status quo" for the three commercial airboat tour operations until completion of the ENP General Management Planning process in 2008. He voiced particular concern over the expected impacts on Everglades Safari.

Transfer of Lands. Representatives of FDOT expressed a strong preference for fee simple title to those lands which will be conveyed to it for the roadway and related facilities. Even where lands will come from the ENP, FDOT stated that it would prefer that the USACE deliver a fee simple title to FDOT because it will need legal authority to own, operate, maintain and improve the roadway.

Representatives of ENP opposed the proposed transfer of 9.25 acres of park lands to SFWMD for a "maintenance swale" south of the culverts in the portion of Tamiami Trail that would be raised as part of the Recommended Plan. ENP believes that maintenance activities can be addressed through a management agreement between the SFWMD and the Park.

Environmental Impact Statement. Representatives of ENP encouraged the USACE to contact ENP's Planning and Compliance Division and Southeast Archeological Center for assistance when addressing impacts to cultural resources in preparation of the affected environment section of the SEIS. ENP also recommended that the SEIS provide a comprehensive assessment of the direct, indirect, and cumulative impacts on all of the existing private interests and seek ways to minimize potential impacts. ENP requested that this SEIS possibly make adjustments to the location of the eastern terminus of the western bridges to make the Recommended Plan more compatible with the existing facilities at Everglades Safari and to alleviate the need for a down ramp.

A representative of ECC appealed to the USACE to design structural modifications and flowage easements that will allow the affected airboat businesses to be retained for public enjoyment consistent with provisions of the Everglades National Park Protection and Expansion Act.

Section 7.0
LIST OF STUDY TEAM MEMBERS AND REPORT PREPARERS

Persons who were responsible for contributing to this EIS are listed in Table 9.

Table 9. Tamiami Trail SEIS List of Preparers

Name	Discipline/ Expertise	Organization	Role in Document Preparation
Bryce McCoy	Engineer	USACE	Project Management
Barbara Cintron	Ecologist	USACE	Project Management; Supervision; Review
Brad Foster	Ecologist	USACE	Plan Formulation, Planning Technical Lead
Jon Moulding	Biologist	USACE	NEPA and Environmental Technical Lead
Jim Riley	Environmental Engineer	USACE	Water Quality
David Pugh	Archaeologist	USACE	Cultural Resources
Kevin Wittmann	Economist	USACE	Economics
Mike Wolz	Civil Engineer	USACE	Design; Review
James McRae	Civil Engineer	USACE	Design and Engineering Technical Lead
Trent Ferguson	Civil Engineer	USACE	Hydrology
Scott Burch	Civil Engineer	USACE	Cost Estimates
Cindy Turner	Real Estate	USACE	Real Estate
John Pax	Attorney	USACE	Legal
Michael Loden	Environmental Scientist	G.E.C., Inc	EIS/Report Preparation; Supervision; Review
Laura Carnes	Environmental Planner	G.E.C., Inc	EIS/Report Preparation; General
Cade E. Carter	Civil Engineer	G.E.C., Inc	EIS/Report Preparation; Engineering
Jeff Robinson	Civil Engineer	G.E.C., Inc	EIS/Report Preparation; Noise and Air Quality
Stephanie Murray	Biologist	G.E.C., Inc	EIS/Report Preparation; Biology
Joseph Wyble	Geologist	G.E.C., Inc	EIS/Report Preparation and Review
Daniel Maher	Economist	G.E.C. Inc	EIS/Report Preparation; Socioeconomics

Section 8.0
GLOSSARY OF TERMS AND ACRONYMS AND ABBREVIATIONS, CONVERSION TABLE

8.1 GLOSSARY

Ameliorate - to improve.

Appurtenant - auxiliary, accessory.

Biodiversity - abundance and variety of living organisms within an area.

Capillary Action - water being elevated into the pores of soils above the free water table.

Coliforms - aerobic bacteria found in the colon.

Contiguous - adjacent.

Conveyance Capacity - the rate, generally measured in cubic ft per second (cfs), at which water can be transported by a canal, aqueduct or ditch.

Culvert - A concrete, metal or plastic passage that transports water under a road or embankment.

Dissolved Oxygen (DO) - the concentration of oxygen dissolved in water.

Dry Season - the months associated with a lower incident of rainfall, hydrologically, for South Florida, October – April.

Endangered Species - a species identified and defined in the Federal Register in accordance with the Endangered Species Act of 1976.

Environmental Justice - a term used to describe any disproportionately high and adverse affects of Federal agency activities and programs on minority and low income populations within a project area.

Evapotranspiration - the total water loss from the soil.

Fauna - animal life.

Flora - plant life.

Flow Rate - the number of items per unit of time.

Flowage Easements - easements acquired for the right to manipulate water levels in a certain area.

Habitat Fragmentation - the splitting of natural ecosystems into smaller, isolated units.

Hammock - localized, thick stands of trees that can grow on natural rises of only a few inches in the land.

Hydraulic Head – Water-level or pressure expressed as water column height above an arbitrary datum (e.g., culvert centerline).

Hydroperiod - the length of time an area is inundated with water.

Lithologic Units - areas of rock formations.

Lithology - the scientific study of rocks.

Marl - soils comprised of clays, carbonates and shell remains.

Milling - removal of an asphalt layer on a road surface by means of mechanical cutters.

National Ambient Air Quality Standards - standard air pollutant levels set forth by the Environmental Protection Agency (EPA) under the Clean Air Act.

Nonattainment - describes an area where air pollution levels persistently exceed the National Ambient Air Quality Standards (NAAQS).

Oolitic - composed of calcium carbonate.

Overtopping - when flood waters rise above the top of a structure.

PAHs - Polynuclear aromatic hydrocarbons are often byproducts of petroleum processing or combustion. Some of these water insoluble compounds are highly carcinogenic at relatively low levels.

Peat - soil rich in humus or organic material that is highly porous.

Physiographic - describes the features and phenomena of nature.

Porosity - the amount of pore space.

Prairie - land predominantly covered by grasses.

Prime and Unique Farmlands - land that has the best combination of physical and chemical characteristics for producing crops and/or specific high-value food (Farmland Protection Policy Act of 1991).

Recharge - the processes of water filling the voids in an aquifer.

Recognized Environmental Condition - the presence or likely presence of any regulated substance or pesticide under conditions that indicate a release, threatened release or suspected release of any regulated substance or pesticide into structures, surface water, sediments, groundwater, soil, fill or geologic materials. The term shall not include *de minimis* conditions that do not present a threat to human health or the environment.

Sequences - layers of deposit beneath the soil surface.

Sensitive Receptors - specific areas within a project area that can be directly affected by project activities such as noise levels and air contaminants.

Spatially Variable - not the same in all areas.

Specific Conductance - a measure of the electrical conductivity of dissolved ions in the water.

Spillway - an overflow structure of a dam.

Spoil Area - an area where dredged or excavated soil or rock material is deposited.

Threatened Species - a species identified and defined in the Federal Register in accordance with the Endangered Species Act of 1976.

Transmissivity - a measure of the amount of radiation propagated through a given medium.

Vinyl Chloride - a flammable gaseous carcinogenic compound used in making vinyl resins.

Volatile Organic Compounds (VOCs) - any compound of carbon that participates in atmospheric photochemical reactions such as benzene, toluene, and vinyl chloride.

Warm Starts - the ignition of an engine after the engine has been run for a given amount of time.

Watershed - the area drained by a river or river system.

Wet Season - Hydrologically, for South Florida, the months associated with a higher incident of rainfall, May – September.

8.2 ACRONYMS AND ABBREVIATIONS

AAHU - Average Annual Habitat Unit
ADT - Average Daily Traffic
AFDM - ash-free dry mass
BEA - Bureau of Economic Analysis
BLS - Bureau of Labor Statistics
BOD - Biochemical Oxygen Demand
C&SF - Central and Southern Florida
CAA - Clean Air Act
CAAA - Clean Air Act Amendments
CAR - Coordination Act Report
CE/ICA - Cost Effectiveness and Incremental Cost Analysis
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CERP - Comprehensive Everglades Restoration Plan
CO - Carbon Monoxide
cpu - Color Photometric Units
CSOP - Combined Structural and Operational Plan
CWA - Clean Water Act
DERM - Department of Environmental Resources Management
DO - Dissolved Oxygen
DOC - Dissolved Organic Carbon
DOI - Department of Interior
DSL - Design Service Life
EDC – Engineering During Construction
EIS - Environmental Impact Statement
EMO - Environmental Management Office
ENP - Everglades National Park
EO - Executive Order
ER - Engineering Regulation
FAC - Florida Archaeological Council

FDEP - Florida Department of Environmental Protection
FDHR - Florida Division of Historical Resources
FDOT - Florida Department of Transportation
FFWCC - Florida Fish and Wildlife Conservation Commission
FHWA - Federal Highway Administration
ft - Feet
FWC - Florida Fish and Wildlife Commission
FWCAR - Fish and Wildlife Coordination Act Report
FWS - U.S. Fish and Wildlife Service
GDM - General Design Memorandum
g/sm/d - Grams Per Square Meter Per Day
gpm - Grams Per Mile
GRR - General Reevaluation Report
HCM - Highway Capacity Manual
HTRW - Hazardous, Toxic, and Radiological Waste
IDC - Interest During Construction
IOP - Interim Operational Plan
L-67 ext - Extension of Levee 67
LOS - Level of Service
MOT - Maintenance of Traffic
MPO - Metropolitan Planning Organization
MWD - Modified Water Deliveries
NAAQS - National Ambient Air Quality Standards
NAPLs - Non-aqueous Phase Liquids
NEPA - National Environmental Policy Act
NESS - Northeast Shark River Slough
mg - Milligrams
mph - Miles Per Hour
NH3 - Ammonia Nitrogen
NHPA - National Historic Preservation Act
NO_3 NO_2 - Nitrate-Nitrite
NO_x - Oxides of Nitrogen
NPL - National Priority List
NPS - National Park Service
NRHP - National Registry of Historic Places
NSM - Natural System Model
NVGD - National Vertical Geodetic Datum
OFW - Outstanding Florida Water
OMRRR - Operation, Maintenance, Repair, Replacement, and Rehabilitation
OP - Ortho-phosphorus
PAHs - Polycyclic Aromatic Hydrocarbons
PCBs - Polychlorinated Biphenyls
PD&E Manual - Project Development and Environment Manual
PED - Pre-construction Engineering and Design

PIR - Project Implementation Report
PM - Performance Measure
PMP - Project Management Plan
ppm - Parts Per Million
RCRA - Resource Conservation and Recovery Act
ROPA - Register of Professional Archaeologists
RPA - Reasonable and Prudent Alternatives
S/A – Supervision and Administration
S-12s - Structure 12s
SCDS - South Dade Conveyance System
SETS - Supplemental Environmental Impact Statement
SFWMD - South Florida Water Management District
SFWMM - South Florida Water Management Model
SHPO - State Historic Preservation Office
SRS - Shark River Slough
SWIM - Surface Water Improvement Management
TBT - Tributyltin
TCE - Trichloroethylene
TDS - Total Dissolved Solids
TKN - Total Kjeldahl Nitrogen
TMDLs - Total Maximum Daily Loads
TP - Total Phosphorus
TSS - Total Suspended Solids
TTM - Tamiami Trail Modifications
USACE - U.S. Army Corps of Engineers
USEPA - U.S. Environmental Protection Agency
USGS - U.S. Geological Survey
UST - Underground Storage Tank
VOC - Volatile Organic Carbon
VOCs - Volatile Organic Compounds
vpd - Vehicles Per Day
vph - Vehicles Per Hour
WCA 3A - Water Conservation Area 3A
WCA-3B - Water Conservation Area 3B
WQC - Water Quality Certification

8.3 CONVERSION TABLE

To Convert From	To	Multiply By
AREA		
Acres	square ft square meters hectares	43560 4046.9 0.40469
Hectares	acres	2.4710

To Convert From	To	Multiply By
	square ft	107639
	square meters	10000
Square centimeters	square inches	0.1550
Square ft	acres	0.00002295
	square meters	0.092903
Square kilometers	acres	247.1059
	square miles	0.38610
Square meters	acres	0.00024710
	square ft	10.7639
Square miles	acres	640
	square kilometers	2.59
Square yards	acres	0.00020661
	square meters	0.8361
FLOW RATE VOLUME		
Cubic ft per minute	kilograms per minute	0.4536
Cubic meters per hour	cubic centimeters per second	471.9
	cubic meters per second	0.0004719
	cubic meters per hour	1.699
	liters per second	0.4719
	gallons (US) per second	0.2247
	pounds of water per minute (at 68°F)	62.32
Cubic meters per second	cubic meters per second	0.028317
	cubic meters per minute	1.699
	cubic meters per hour	101.9
	gallons (US) per minute	448.8
	gallons (imp) per hour	646315
	liters	28.32
Gallons (US) per minute	cubic meters per minute	0.016667
	cubic meters per second	0.00027778
	gallons (US) per minute	4.4033
	liters per second	0.27778
Liters per minute	cubic meters per hour	3600
	gallons (US) per minute	15850
Liters per second	cubic meters per second	0.000063090
	cubic meters per minute	0.0037854
	cubic meters per hour	0.2771
	cubic ft per second	0.002228
	cubic ft per hour	8.021
	liters per second	0.06309
Standard cubic ft per minute	cubic meters per second	0.001
	cubic meters per minute	0.06
	cubic meters per hour	3.600
	liters per minute	60
	gallons (US) per minute	15.85
	gallons (imp) per minute	13.20

To Convert From	To	Multiply By
LENGTH		
Feet	inches	12
Inches	ft	0.0833
	meters	0.0254
	yards	0.02778
Kilometers	centimeters	100000
	inches	39370
	meters	1000
	yards	1093.61
Meters	centimeters	100
	ft	3.28
	millimeters	1000
	yards	1.0936
Millimeters	ft	0.00328
	inches	0.03937
	yards	0.001094
Statute miles	Inches	63360
	ft	5280
	meters	1609.344
	yards	1760
Yards	Feet	3
	inches	36
	meters	0.9144
	st. miles	0.0005682
MASS/WEIGHT		
Grams	milligrams	1000
	centigrams	100
	decagrams	0.1
	hectagrams	0.01
	kilograms	0.001
	pounds	0.0022
	ounces	0.03527
Kilograms	grams	1000
	ounces (avoir)	35.27
	pounds	2.2046
Metric tons (tonnes)	ounces (avoir)	0.035274
	pounds (avoir)	0.0022046
Ounces (avoir)	pounds	0.0625
	tons (short)	0.00003125
Pounds (avoir)	kilograms	0.4536
	ounces	16
	tons	0.0005
Metric tons	ounces	32000
	grams	907.185
	kilograms	907.1847

To Convert From	To	Multiply By
	pounds-avoir	2000
VOLUME		
Barrels (oil)	cubic ft	5.615
	gallons (US liquid)	42
	cubic meters	0.159
	liter	158.99
	quart (US liquid)	168
Cubic centimeters	gallons (US liquid)	0.0002642
Cubic ft	cubic yard	0.037
	gallons (US liquid)	7.48
	cubic meters	0.02832
Cubic inches	cubic ft	0.0005787
	cubic yards	0.0000214
	gallons (US liquid)	0.004329
	liters	0.01639
Cubic meters	cubic centimeters	1,000,000
	cubic inches	61,023.74
	cubic yards	1.308
	gallons (US)	264.172
	liters	1,000
Cubic yards	cubic centimeters	764554.86
	cubic ft	27
	cubic meters	0.7646
	gallons (US liquid)	201.974
	liters	764.55
Gallons (US liquid)	cubic inches	231
	liters	3.7854
	pint (US liquid)	8
	ounce (US liquid)	128
	quart (US liquid)	4
Liters	cubic centimeters	1000
	cubic meters	0.001
	cubic ft	0.03531
	cubic yards	0.001308
	gallons (US liquid)	0.2642
Milligrams per liter	parts per thousand	0.001
	parts per million	1.0
	parts per billion	1000

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SOURCES CITED OR USED IN THE STUDY

Bingham, R.L., H.V. Neal, and A.A. El-Agroudy, A.A. 2002. Characterization of the Potential Impacts of Stormwater Runoff from Highways on the Neighboring Water Bodies Case Study: Tamiami Trail Project. 7th Biennial Stormwat. Res. & Watershed Mgt. Conf: 229-239.

Driscoll, E, D., P.E. Shelley, and E.W. Strecker. 1990. Pollutant Loadings and Impacts from Highway Stormwater Runoff, Volume 1. Federal Highway Administration. April 1990.

Federal Highway Administration (FHWA). 1997. Research and Technology Program Highlights. http://www/tfhrc.gov/libraty/r&t.htm

Florida Department of Transportation. Internet Site. http:/www.dot.state.fl.us/evacuationstudy/reportexecsummary.htm

Florida Department of Transportation. 1999. Florida Land Use Cover and Forms Classification System Handbook. Third Edition.

IWR. 2000. Risk Analysis for Water Resources Investments Newsletter. Issue No. 4, Summer 2000. U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, Virginia.

Janus Research. 2001. Cultural Resource Assessment Survey for the Tamiami Trail Project Area in Miami-Dade County, Florida. Prepared for the U.S. Army Corps of Engineers, Jacksonville District. Janus Research, Inc., St. Petersburg.

Miller, R.L., B.J. McPherson, and K.H. Haag. 1999. Water Quality in the Southern Everglades and Big Cypress Swamp in the Vicinity of the Tamiami Trail, 1996-1997. U.S. Geological Survey Water Resources Investigation Report 99-4062.

New South Associates. 2006. A Cultural Resource Survey, Tamiami Trail, Modified Waters to the Everglades National Park – GRR/SEIS. 88 pp + app.

Ogden, J.C. 1990. Habitat management guidelines for the wood stork in the southeast region. Prepared for the U.S. Fish and Wildlife Service; Atlanta, Georgia.

Randazzo, A.F. and S.J. Douglas (eds.). 2000. The Geology of Florida. University Press of Florida. 400 p.

Schwadron, M. 2006a. Report on Archeological Survey of Lands Proposed for Exchange from the Eastern Everglades Expansion Area, Everglades National Park, FL. Southeast Archeological Center, Tallahassee, FL. January 2006.

Schwadron, M. 2006b. Archeological Assessment of the Eastern Everglades Expansion Lands, Everglades National Park, FL. Southeast Archeological Center, Tallahassee, FL, August 2006. [ENP Comment 6]

Scott, T.M. 1992. A Geologic overview of Florida. Florida Geological Survey Special Publication Number 32. Florida's Ground Water Quality Monitoring Program. 104p.

South Florida Water Management District. 2000. District Draft Water Management Plan.

Sullivan, M.P., Zhida Song-James, and G. Prelewicz. 1996. Water Quality Data Evaluations and Analysis for the Florida Everglades. Presented at Watershed 96 Conference. USEPA.

USACE. 1992. General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. 1998. Central and Southern Florida Project Comprehensive Review Study, Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. 2000. Central and Southern Florida Project, Modified Water Deliveries to Everglades National Park, Florida, 8.5 Square Mile Area, GRR and FSEIS (2000). U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. 2000. Central and Southern Florida Project, Draft Integrated General Reevaluation Report, Supplement and Environmental Assessment, Canal 111 (C-111) (2000). U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. 2003. Central and Southern Florida Project, Modified Water Deliveries to Everglades National Park, GRR/SEIS for the Tamiami Trail, December 2003. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE. 2005. Central and Southern Florida Project, Modified Water Deliveries to Everglades National Park, RGRR/SEIS, Engineering Appendix for the Tamiami Trail Modifications, Draft Final Submittal, Alternative 10 (Central), July 8, 2005. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USACE and SFWMD. 2002. Project Management Plan WCA-3 Decompartmentalization and Sheetflow Enhancement Project. Part 1. U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL.

USDA. 1996. Soil Survey of Dade County Area, Florida. U.S. Department of Agriculture, Natural Resources Conservation Service.

USEPA. 1993. Guidance Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters. U.S. Environmental Protection Agency Publication No. EPA-840B-93-001c, January 1993.

USFWS. 2003. Final Fish and Wildlife Coordination Act Report, Modified Water Deliveries to Everglades National Park: Tamiami Trail Project, Miami-Dade County, Florida. U.S. Fish and Wildlife Service, South Florida Field Office, Vero Beach, FL.

USFWS. 2005. Draft Supplemental Fish and Wildlife Coordination Act Report, Modified Water Deliveries to Everglades National Park: Tamiami Trail Project, Miami-Dade County, Florida. U.S. Fish and Wildlife Service, South Florida Field Office, Vero Beach, FL.

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